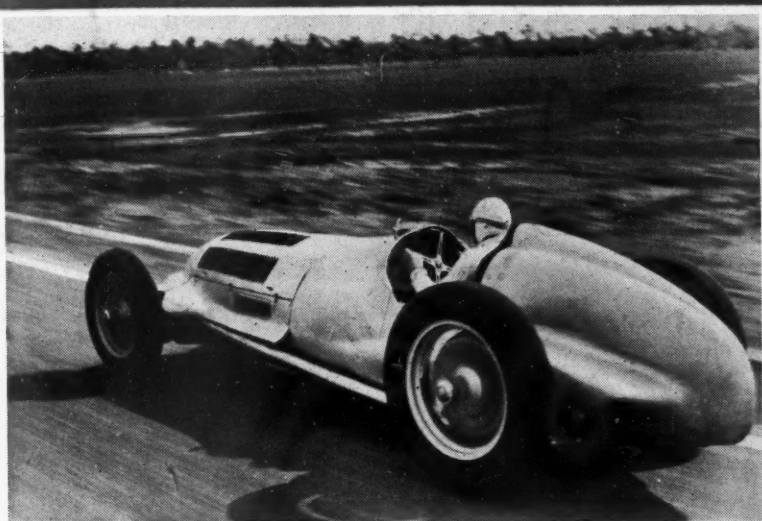


Aug 11 1939

MOTOR AGE

A CHILTON PUBLICATION

DEVOTED TO THE INTERESTS OF THE INDEPENDENT SERVICE STATION



A Mercedes during speed trials for the Tripoli Grand Prix.

The winning of this year's Indianapolis Classic by a foreign car may mean that more of them will be seen on our tracks next year. The significance of this to American drivers and car manufacturers is pointed out in an unusually "meaty" story, "Indianapolis Invasion", which you'll find on page 13 of this issue.

Three maintenance stories in this issue we believe you will find of particular interest. We call your attention to "Chevrolet Shifter Maintenance", "Hot Points on Fender Straightening" and "Servicing the GM Diesel Blower".

This issue also contains a story on Ford's reentry in the tractor field with a low-priced unit with unusual characteristics. You'll find the story on page 16.

AUGUST
1939



TOUGH

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NO MATHEMATICS

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MOTOR AGE

DEVOTED TO THE INTERESTS OF THE INDEPENDENT SERVICE STATION

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August, 1939

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MOTOR AGE

AUGUST 1939

Wrecks

With 25 million passenger cars on the road it is easy to understand why independent service stations find wreck work forming an ever increasing portion of their business. The only difficulty in conducting such business is how much to charge the customer. If it were possible to always work on a time and material basis it would be a lead pipe cinch. But unfortunately the car owner and, more particularly, the insurance companies want to know "how much" before they order the work done.

In order to form a basis for estimating on wreck work MOTOR AGE has developed a series of articles which will enable a shop to gage more accurately the prices to be charged for such work. These articles start in the September issue. Watch for them and keep them handy.

Races

While most of the spectators have already forgotten the stock car race held on July 4 at Langhorne, Pa., the AAA officials will probably always remember it as one of the toughest races ever held, as it required over nine hours to unscramble the tape in order to determine the winner. You can imagine the job when you realize that there were 42 cars on a mile track. In a normal race about one-third will be running at the finish, but at Langhorne only about 10 cars dropped out.

From the standpoint of service work, the race was of interest because of the number of pit stops for water. Overheating seemed to be the main trouble encountered in

SHOP TALK

the race. However, when you consider that the cars were standard sedans equipped with fenders and that the race was slowed up for about 20 minutes, the winners speed of 66 m.p.h. was mighty good.

Files

From A. J. Detrie, an automotive engineer of Standard Oil, in Greenbay, Wis., comes the suggestion that I try to segregate the articles in MOTOR AGE so that they are more easily filed under various subject headings. It seems he gets into "filing" trouble when one article is

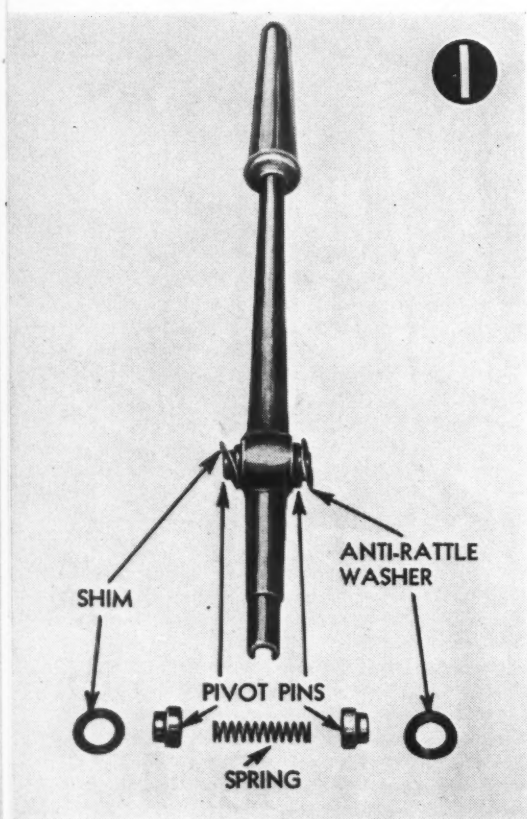
backed up on another. Sorry, but there is nothing I can do to help that situation. I've tried many times to dope out some method, but not one of them works all the time. Personally I think the best bet is not to file the articles but keep the entire issue intact and keep a card index file showing the issue in which the various articles appear. In that way the general index which appears in the January issue of MOTOR AGE will be of greatest value.

Bill Toboak



Chevrolet

Shifter Maintenance



WHILE there is nothing difficult in servicing the Chevrolet vacuum gear shift, considerable time will be wasted unless the mechanic knows what to expect. The service instructions given by the Chevrolet factory are as follows:

Disassembly

1—Remove the steering wheel and the spring which retains the mast jacket bearing. (Master De-Luxe Models only.)

2—Remove the nuts from the steering gear to instrument panel bracket and remove the "U" clamp.

3—Raise the steering gear toe-

board grommet up on the mast jacket about 12 in.

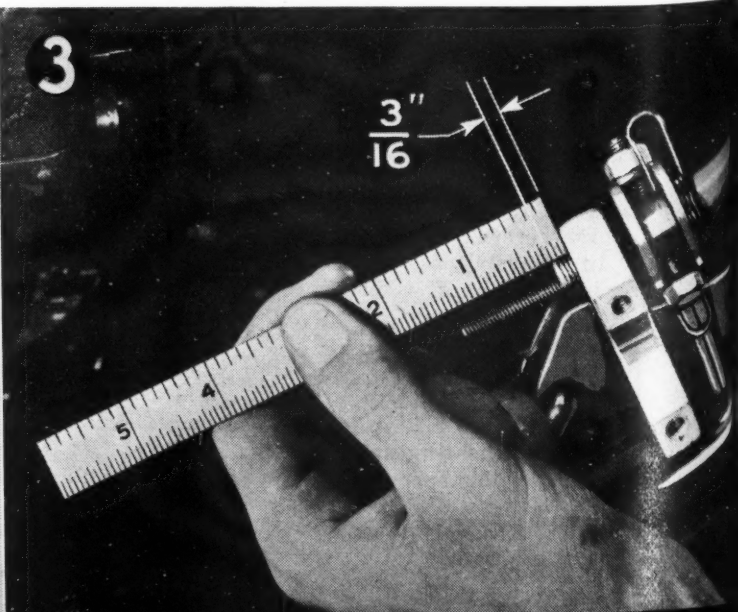
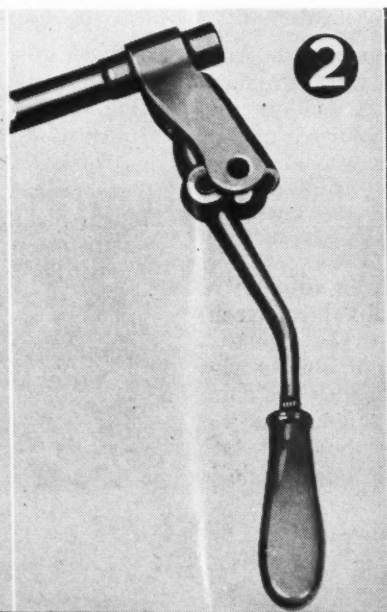
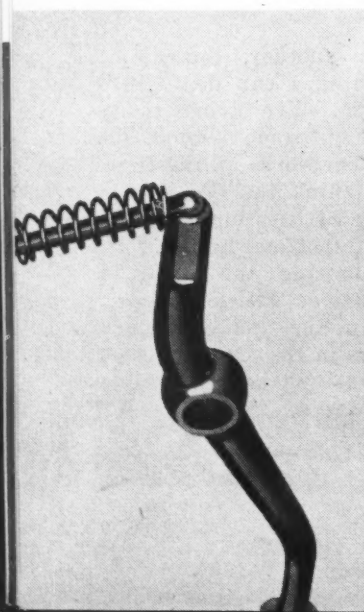
4—Disconnect the selector rod from the selector lever and the gearshift control rod from the shift control lever.

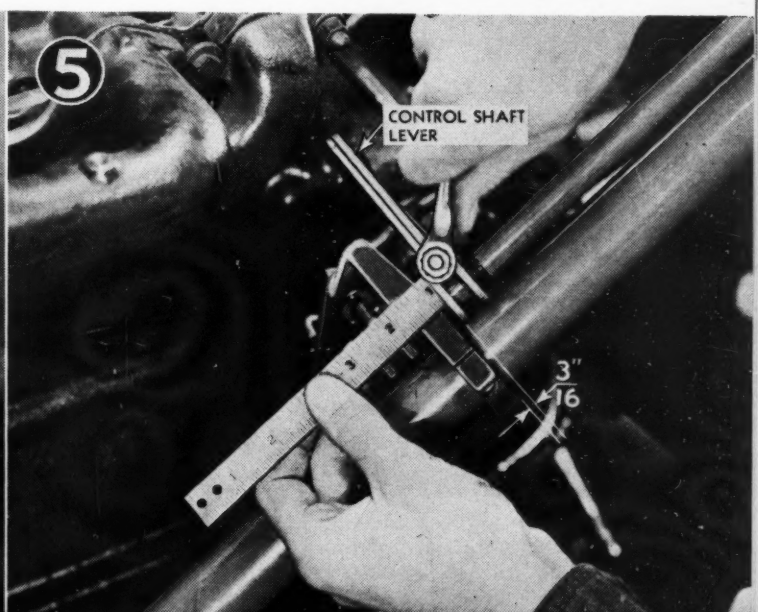
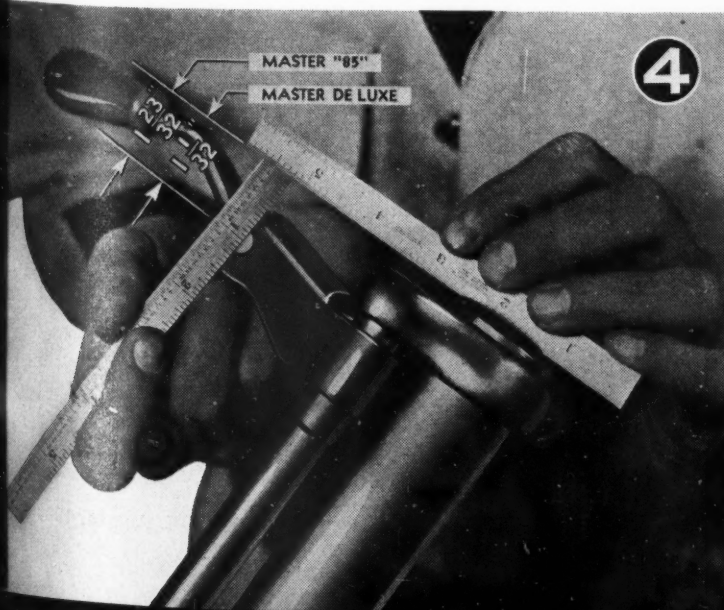
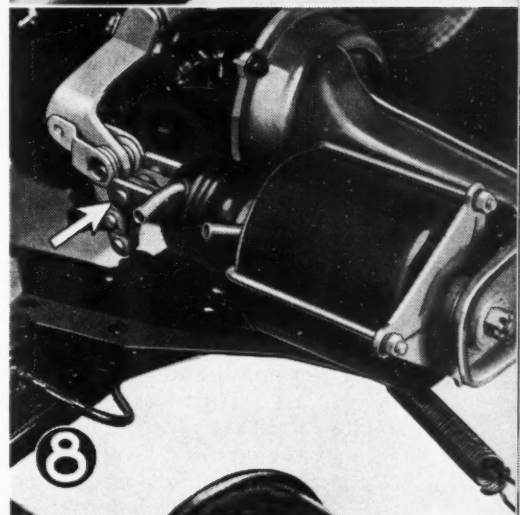
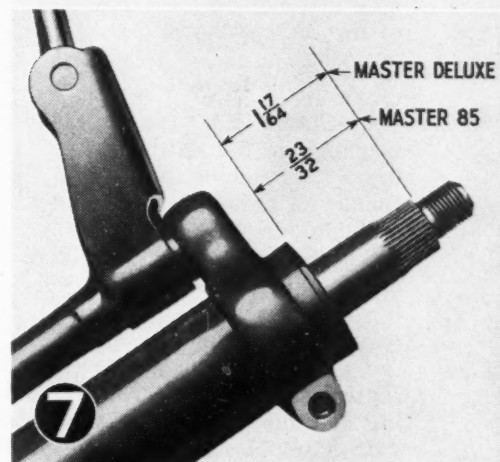
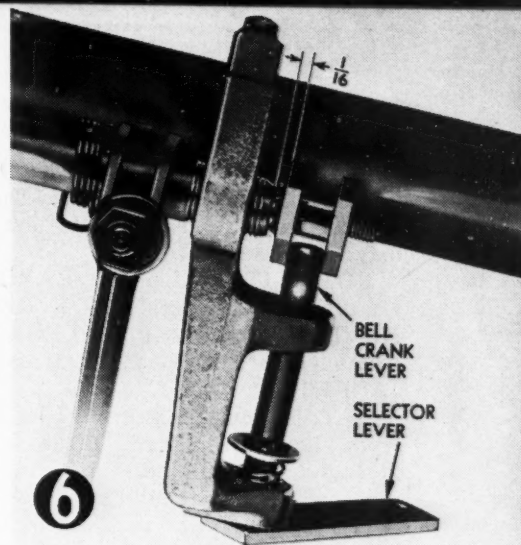
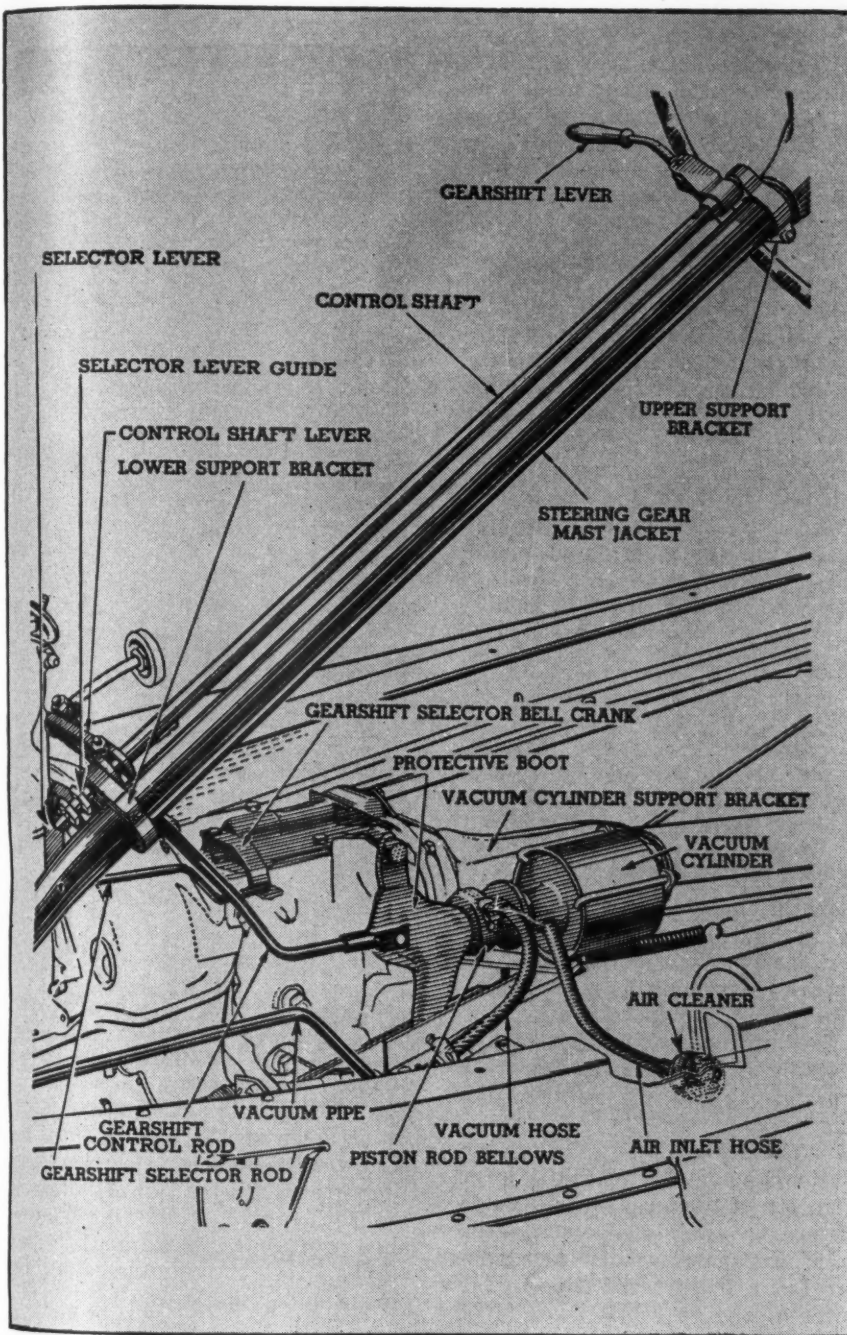
5—Remove the lock nut and the selector control lever guide from the end of the selector control shaft.

6—Remove the screws from the lower support bracket and unscrew the bracket from the control shaft.

7—Loosen clamp on the control shaft lever and remove it and the counter-balancing spring from the

(Continued on page 12)





(Continued from preceding page)
lower end of the control shaft. The control shaft with gearshift lever may now be removed.

NOTE—IT WILL VERY RARELY BE NECESSARY TO REMOVE THE UPPER SUPPORT BRACKET FROM THE MAST JACKET.

8—To remove the gearshift lever from the control shaft, press the pivot pin on each side of the housing inward and remove the lever. The selector push rod assembly may now be removed from the top of the control shaft.

Inspection

1—Check the gearshift lever housing in the control shaft for burrs or roughness. Any burrs should be removed with a fine cut mill file.

2—Check the pivot pins in their bearings in the control shaft housing and also in the gearshift lever to make sure they are free.

3—Check selector push rod in the control shaft. If the rubber bushing is tight in the tube, replace it with Part No. 3651629, Neoprene Bushing. Inspect the opening at the top of the tube for burrs. Any roughness at this point will interfere with the free operation of the selector push rod return spring. Remove any burrs with a rat-tail file.

Reassembly

1—Install the selector push rod in the control shaft. Then install the pivot pins in the gearshift lever with the spring between them. Assemble an anti-rattle washer on one pivot pin and a shim on the other. (Fig. 1.) Then compress the springs until the pins can be slipped into the gearshift lever housing. While this is being done the open end of the gearshift lever must be slipped over the end of the selector push rod as shown in Fig. 2. Check

the operation of the gearshift lever and selector push rod to make sure they are perfectly free.

2—Check the location of the upper support bracket with reference to the top of the mast jacket. The measurement from the top of the bracket to the top of the mast jacket should be $\frac{3}{8}$ in. on Master DeLuxe and $1\frac{3}{16}$ in. on Master "85" models. Make sure the keyway in the bracket mates with the key which projects on the mast jacket. Tighten the bracket screw securely.

3—Thread the control shaft through the hole in the instrument panel bracket and through the hole in the steering gear toe-board grommet.

4—Assemble the counter-balancing spring and shift control lever on the lower end of the control shaft, slipping it up on the "D" section as far as possible.

5—Screw the lower support bracket on the control shaft until the shaft extends beyond the bracket $\frac{3}{16}$ of an inch (Fig. 3).

6—Enter the end of the control shaft in the upper support bracket. Allow the end of the counter-balancing spring to drop in behind the mast jacket; then install the lower support bracket on the mast jacket, being careful to mate the keyway in the bracket with the key on the mast jacket. Install the bracket cap and tighten the screws just snug.

7—The next step is to adjust the relationship of the gearshift lever to the top of the mast jacket. To do this place a straight edge across the top of the mast jacket; then measure from the straight edge to the center of the gearshift lever pivot pins (Fig. 4). This measurement should be $1\frac{11}{32}$ in. on the Master DeLuxe and $1\frac{23}{32}$ in. on the Master "85." The lower support bracket may be shifted up or down on the mast jacket to secure the

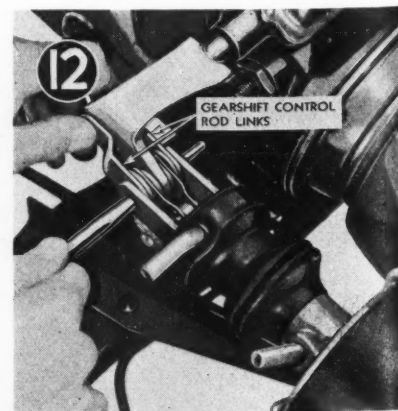
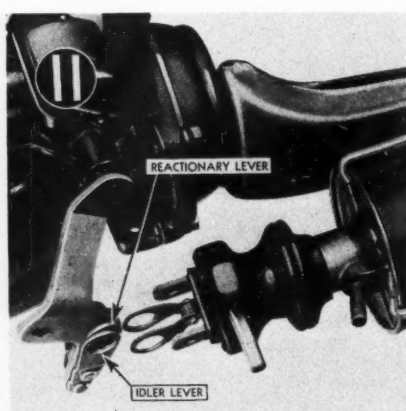
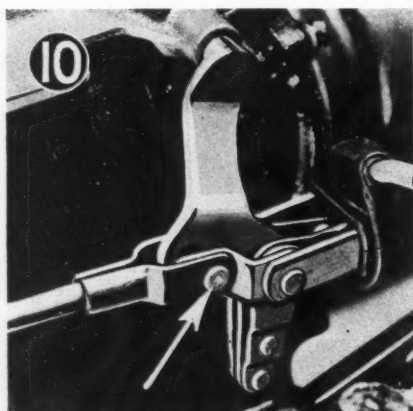


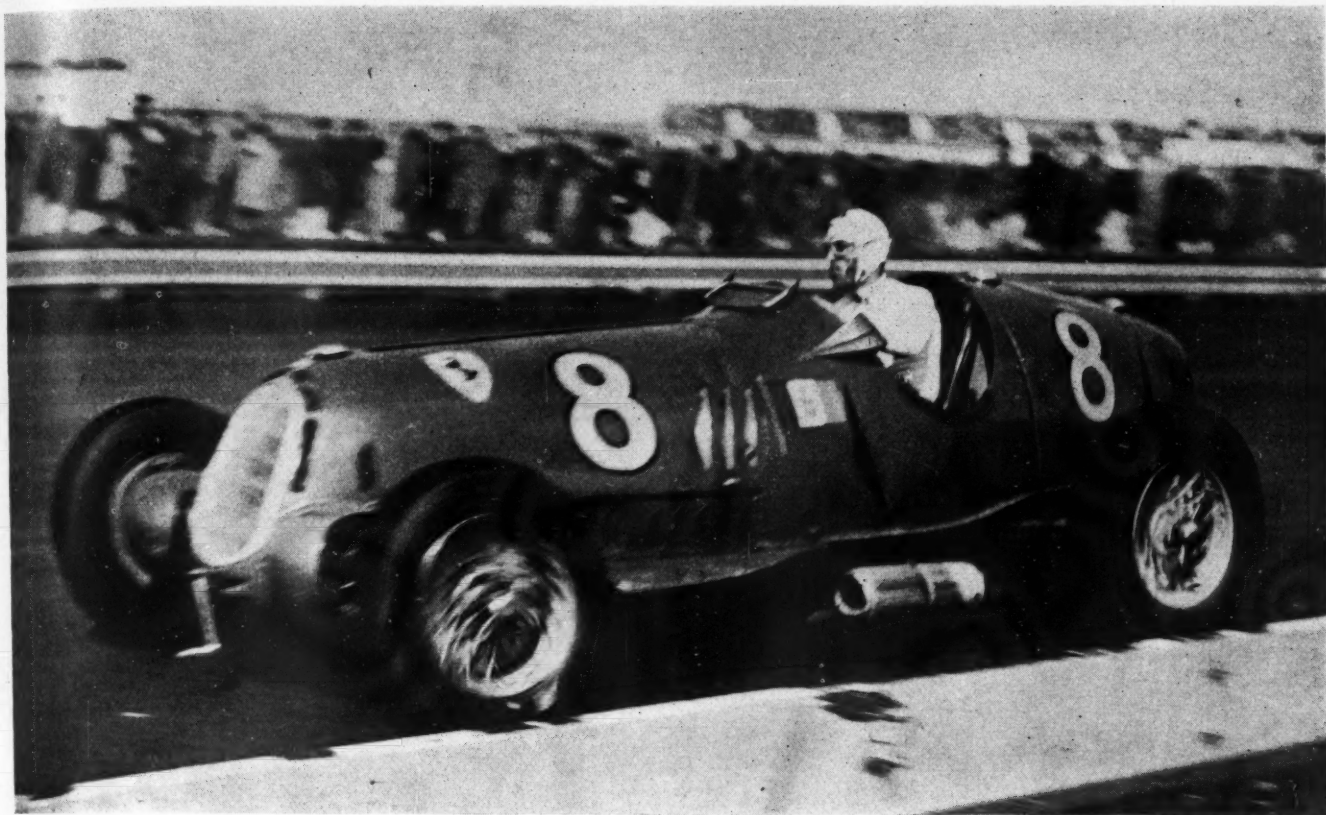
above measurement. After the adjustment is made tighten the lower support bracket screws securely.

8—Adjust the shift control lever up or down on the control shaft to secure $\frac{3}{16}$ in. clearance between the lever and the lower support bracket, Fig. 5; then tighten the shift control lever clamp bolt securely. Hook the counter-balancing spring under the lever.

9—With the end of the selector lever bell crank in the groove of the selector lever guide, screw the guide on the selector control rod until there is $\frac{1}{16}$ in. clearance

(Continued on page 62)





Tazio Nuvolari—one of the top-notch foreign drivers who may again appear on American speedways

Indianapolis Invasion

— by foreign cars is imminent unless
Americans unite to design new race cars

by **ROBERT T. JACKSON**

AMERICAN racing car supremacy in the annual Indianapolis 500 mile race, unbroken for two decades, bowed this year before what could be called the friendly foreign invasion of an Italian Maserati driven by Wilbur Shaw and owned by M. J. Boyle, of Chicago. Observers of the American racing scene are now pointing out that this foreign triumph in 1939 foreshadows more formidable and less friendly foreign invasions in future Indianapolis events.

The winning Maserati, raced as a "Boyle Special," dispelled all

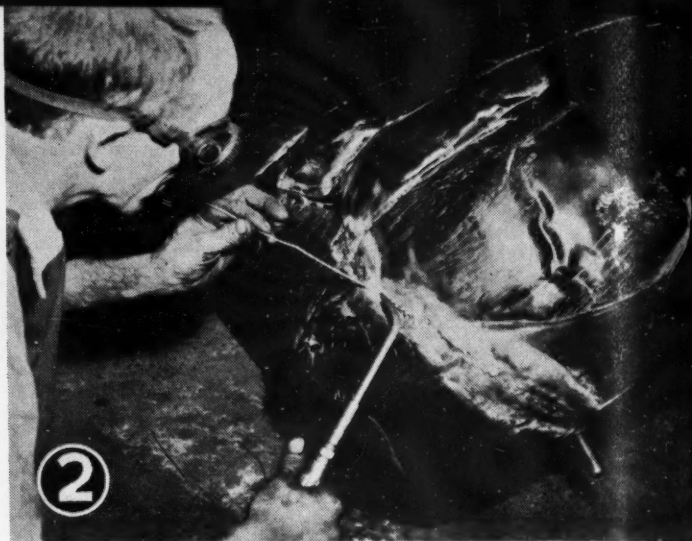
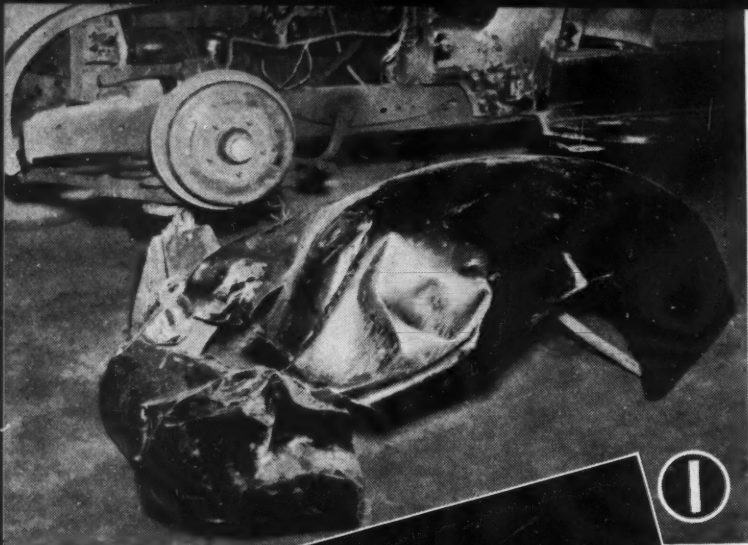
doubts regarding fitness of European cars, built for road racing, in speedway competition. In terms of actual speed, its performance was not phenomenal; as a matter of record, several American machines set up faster lap speeds. In the race itself, however, the Maserati performed with an undeniable consistency and its powerful brakes and fast acceleration through the gears played stout parts in keeping pit stop time at a minimum.

Most notable superiority of the Maserati machine was evident in its chassis. According to Wilbur

Shaw, it possesses a degree of roadability heretofore unapproached in racing cars competing at Indianapolis. It rode extremely well and was easily handled at racing speeds without tiring the driver, qualities which undoubtedly had a strong bearing on its success. Tire wear was astonishing low. Only two tires, a right front and right rear, were changed during the race. These changes were precautionary, made during stops for fuel, and, in the judgment of Firestone technicians, the car could have gone the entire distance without tire replacements.

The Maserati is typical of European racing design in that it has independent front suspension, by torsion bars, a carefully engineered steering mechanism, very light wheels and rather soft springing all around. The advantages of this construction were demonstrated in convincing fashion during the race.

(Continued on page 30)



1. This is a tough job for any fender repair shop. The large crack is three feet long and there are a dozen smaller cracks. The fender is partially hammered into shape.

2. Successive operations of hammering and welding transform the crumpled mass of metal into something more nearly recognizable.



5. The fender is finish-shaped by hammering. The hammer marks are then removed with a "slapper," and weld areas are cleaned with a portable grinder.

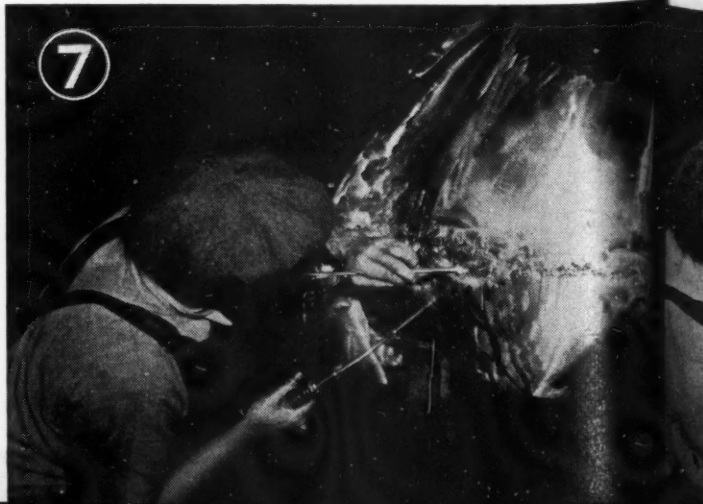
6. The metal is heated slightly and cleaned with acid, then it is tinned with a soft body solder and the tinned areas gone over with a wire brush.

7. Here the depressed weld areas are being filled in with body solder. A soft, excess acetylene flame as slender as a pencil is used for this operation.

Hot on Fender

Here's a step by step photo story on how to straighten fenders. While the illustrations do not show the ding work required to straighten the crushed fender, they illustrate the welding, solder-filling and grinding steps.

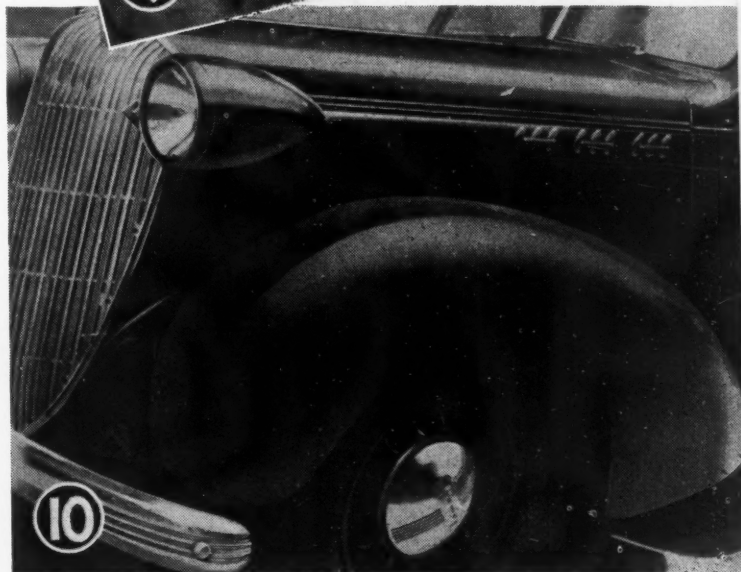
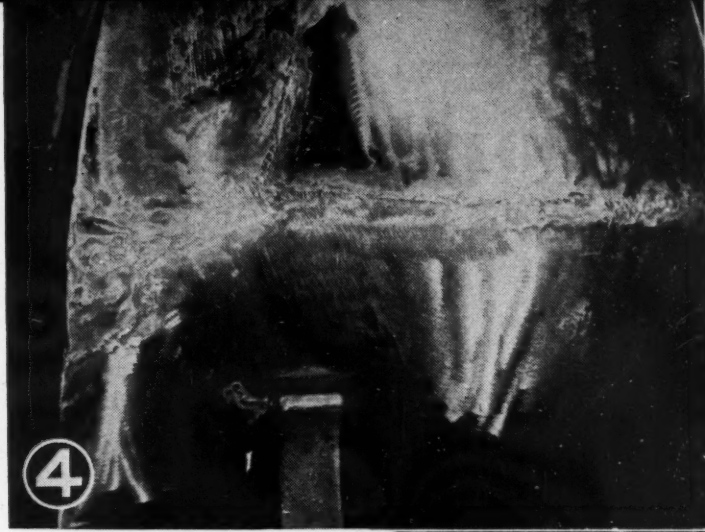
After the fender has been rough shaped with a hammer and dolly block, the larger of the tears was welded in successive stages. A tack weld was made 3 in. from the edge, this section welded, then the fender was further





3. A high spot is removed. The area is heated to a bright red temperature, then hammered with a wooden mallet while the dolly block is held against the underside.

4. This close-up gives a good idea of the extent of the welding repair. Weld metal has been hammered and depressed for subsequent "wiping" operations.



Points

Straightening

hammered and shaped so that another 3 in. section could be similarly tack welded. This procedure was followed until the crack was completely mended. Drawn iron welding rod was used with a neutral flame. While it may not always be economical to repair a fender in such bad condition the illustrations show what can be done in an extreme case.

Photographs through courtesy of Linde Air Products Co.

8. The rough deposit of solder is reheated and smoothed or "wiped" with a wiping paddle. All welds in the fender are treated in this fashion.

9. Finally, all soldered areas are smoothed with a portable grinder. The fender is then attached to the car and is ready for subsequent painting and polishing operations.

10. It's hard to believe that this is the same fender as that shown in the first illustration. Only an expert could tell that it is not a new one.

Ford Builds Tractors Again



A NEW Ford tractor, featured by the Ferguson hydraulic coupling unit which tends to press the front wheels into the ground when an obstruction is encountered, has just been announced. The price is \$585 f.o.b. Detroit.

The new tractor, powered with a 120 cu. in., 4-cylinder, L-head engine, will be distributed by the Ferguson-Sherman Mfg. Corp., Dearborn, Mich., and it is understood that Ford car dealers will be given the first opportunity on the tractor line which includes a two-bottom 14 in. plow priced at \$85, single-bottom 14 in. and 16 in. plows, a row cultivator and a general cultivator.

The Ferguson coupling unit is designed to control the depth of penetration while plowing. The desired depth is obtained by a lever beside the driver's seat, and once set, the same plowing depth will be maintained regardless of the type of soil encountered. As the plows and other implements are rigidly attached to the tractor, it is pos-

sible to back the unit, thereby permitting closer cultivating in corners.

The Ferguson hydraulic coupling consists essentially of a 4-cylinder hydraulic pump which operates a ram. This ram in turn raises or lowers the plow.

As previously mentioned, the method of attaching the plow to the tractor prevents the front wheels of the tractor from rising from the ground. An additional advantage is that lighter weight is permitted, thus resulting in reduced operating costs.

The 3.18 in. by 3.75 in. 4-cylinder engine develops 23 hp. at 1400 r.p.m., and is of conventional L-head design with pressure lubrication to main, rod and camshaft bearings and also to the timing gears. Ignition is provided by a generator, battery and distributor. Electric starting is standard equipment. The fuel system includes a Wheeler-Schebler updraft carburetor, oil-bath type air cleaner, and a 10-gallon fuel tank.

The 9 in. single plate clutch transmits power to the three forward speed and one reverse transmission. All transmission shafts operate on tapered roller bearings.

Final drive is of the spiral bevel gear type with a straddle-mounted pinion, the ratio being 6.66 to 1. Axle is of the semi-floating type with integral shafts and hubs.

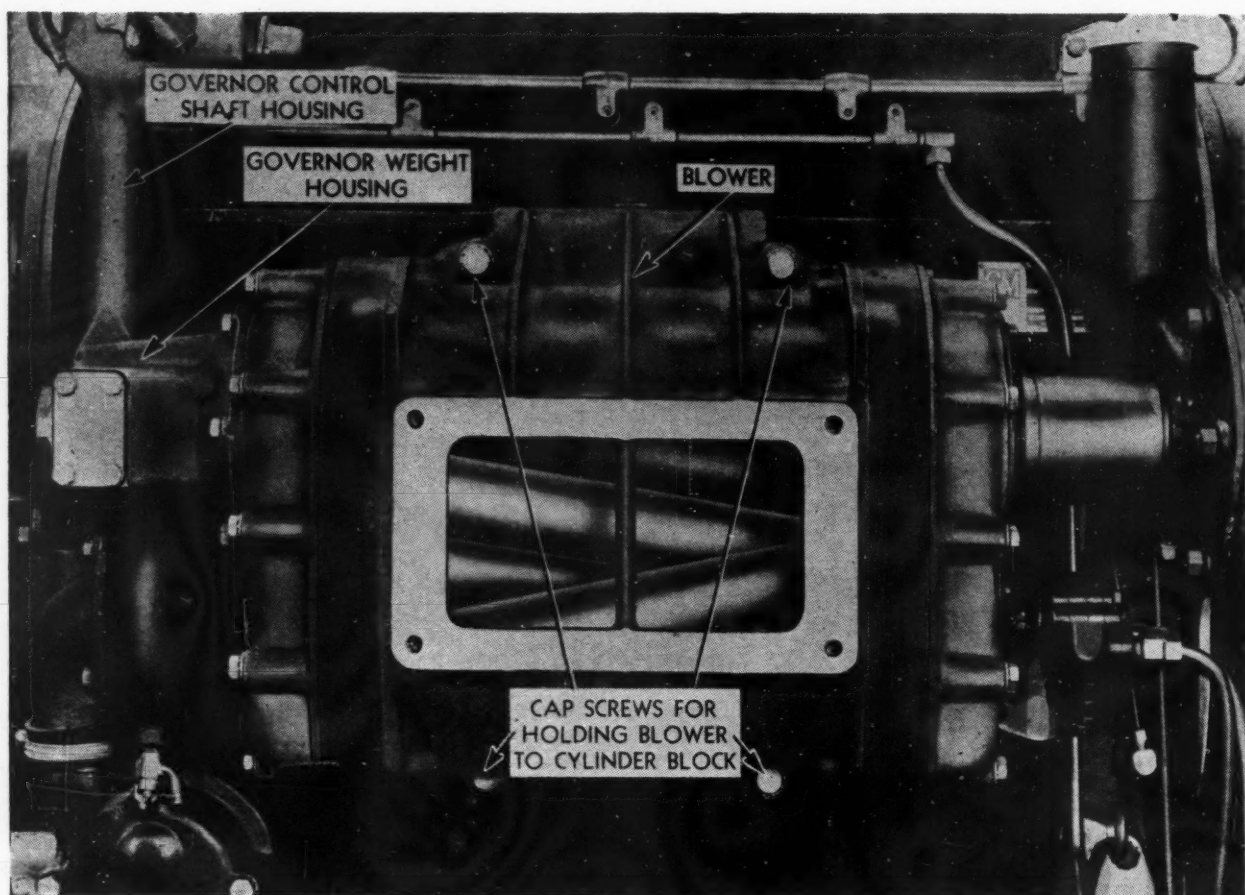
A variable speed governor, controlled from the steering column, maintains the tractor speeds at 2½ m.p.h., 3¼ m.p.h., and 6 m.p.h. with the transmission in first, second and direct drive, respectively, and the engine turning at 1400 r.p.m.

Two-shoe brakes at the rear wheels are provided with separate control pedals to facilitate turning.

In accordance with modern practice, pneumatic tires are standard equipment, and steel wheels with lugs optional at extra cost. Both front and rear tread are adjustable. Wheelbase is 70 in. Power take-off and lighting system are offered as extra equipment.



"I finally found that rattle—it's in his false teeth"



The GM Roots type blower with inspection plate removed. It has a rotor length of $2\frac{1}{2}$ in. per cyl.

Servicing The GM

THE blower on the General Motors two-cycle diesel engine is a matter of great interest to maintenance men, not as a source of new maintenance problems nor as a unit requiring frequent inspection, but as the first pressure unit that has been applied to the intake system of a truck engine as standard equipment. This blower is of the Roots type. The housing, rotors, end plates and covers are made of aluminum and there is $2\frac{1}{2}$ in. of blower per cylinder. Thus the blower rotors of a four cylinder engine are 10 in. long.

The blower on all GM engines turns at 1.94 times engine speed. It produces a maximum air pressure of about 7 lb. at the maximum

This article is not intended to replace shop manuals furnished by manufacturer

engine speed of 2000 r.p.m. and between 4 and 6 lb. at 1200 r.p.m.

From a failure standpoint there are not very many things that can possibly happen to a blower. It is of course gear driven but the gears are well lubricated and the accessory shaft is provided with a spring coupling at the accessory gear in the timing gear train to prevent shock loading.

There is a double row ball bearing on the drive end of each rotor and a single row ball bearing on the front end of each rotor.

These ball bearings are subject only to the failures common to all ball bearings since loads and speeds are normal. They are a suck fit in the housing and the chances of the bearing turning in the housing are no greater than they would be in any type of installation.

Two rawhide type oil retainers complete the wearing parts of the blower since the rotors do not touch each other or the housing. No adjustment of blower parts is required except in case of dis-assembly. The period for dis-assembly

By HENRY JENNINGS

TECHNICAL EDITOR, COMMERCIAL CAR JOURNAL

for complete inspection would seem to be at engine complete overhaul period.

To dis-assemble the blower, it must first be removed from the engine with the water pump which is driven from the front end of the blower countershaft, the governor which is driven from the front end of the blower mainshaft and the fuel pump which is driven from the rear end of the countershaft. This means that the cooling system must be drained, the water pump couplings, governor linkage and fuel lines must be disconnected. The accessory shaft cover bolts removed at the rear flange and then when the blower to engine bolts are removed the blower can be moved slightly forward, uncoupling accessory drive shaft which leaves it free.

After the accessories have been removed the blower can be disassembled. This can be done only with a special puller. Undoubtedly the unit can be dismantled without the puller but the end plates are fitted to the blower body without gaskets and located by dowels. If these end

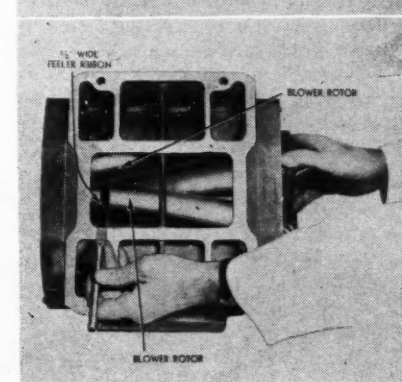
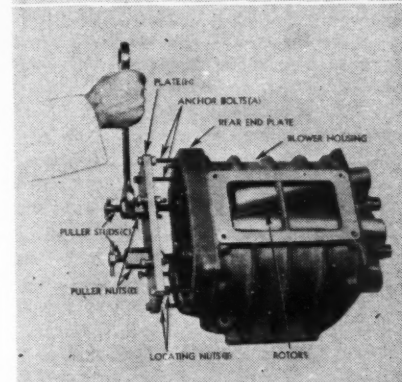
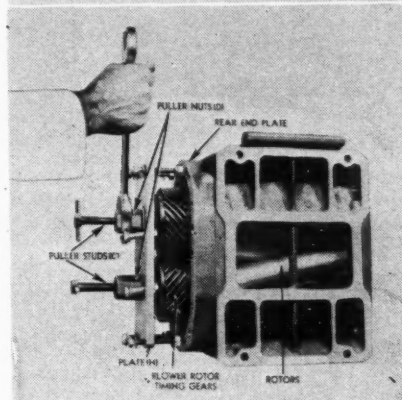
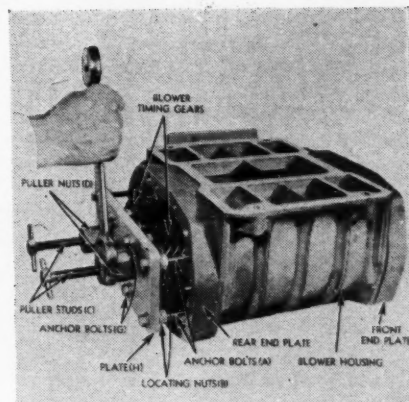
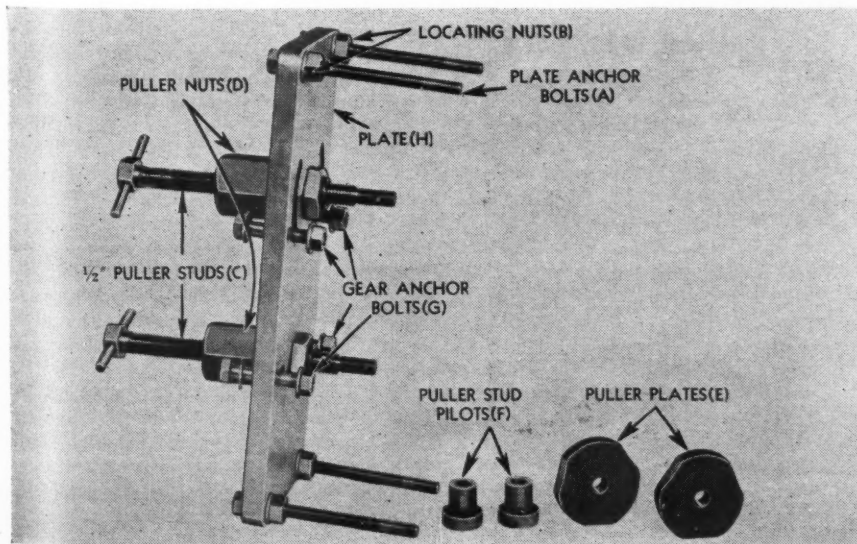
plates are pried from the body with a sharp tool the machined surfaces of the blower body and end plates will be ruined. This will result in a blower that leaks air and possibly oil and in addition the blower will not meet output specifications because the end clearance between rotors and end plates will be increased. There are no gaskets between end plates and blower body.

The end plate covers can be removed by removing capscrews and tapping plates away with a raw hide hammer. Then the blower drive shaft flange and the capscrews that hold the gears in place can be removed. Remember that the flat washer goes on the upper gear and that the dished washer with the driving lugs for the fuel pump goes on the lower gear. Remove two filler head screws from each end plate.

The puller is arranged so that it will pull both gears at once which is the only way that they can be removed and at the same time shove the front end plate off. This is done by screwing puller studs (C)

(Continued on page 37)

Diesel Blower



Left: Combination puller which makes blower disassembly easy. Without this tool disassembly is next to impossible. Above: The combination puller in action. Top: Pulling the rotor timing gears and pushing off the front end plate in one operation. Next: pulling rear end plate from the blower housing. Next: pushing the rotor shafts from the front end plate bearings. Bottom: checking rotor clearance with feeler. End clearance must also be checked.



Here's how to mount a tire and tube on the rim with minimum effort—in approximately 20 seconds! At the Plymouth factory, a motor below the table revolves the rim while the workman's guide wheel "rolls" the tire into proper place.

Two-Speed Axle Lubricant

During the summer months, or when the atmospheric temperatures are very high and the Chevrolet truck is excessively overloaded or subject to other severe service conditions, a heavier grade of lubricant, such as S.A.E. 140, may be used.

While S.A.E. 90 rear axle lubricant will provide satisfactory "year-round" lubrication for most territories, there are some sections where extremely low temperatures are encountered for protracted periods during the winter months. In such sections S.A.E. 80 rear axle lubricant, or S.A.E. 90 to which has been added 10 per cent to 20 per cent kerosene, may be used.

While seasonal changes of the lubricant are not required, it is recommended that you have the housing drained, flushed, and refilled with proper grade of lubricant twice a year, or approximately every 6,000 to 10,000 miles. It may be found neces-

Service Hints

from

The Factories

sary and desirable to drain the rear axle on trucks subjected to severe service more frequently than recommended above.

The lubricant level should be checked periodically and lubricant added if required. The capacity of the 2-Speed Axle is 13½ pt.

Replacing Flywheel Housing—1939 Pontiac Eight

In removing and replacing the flywheel housing on a 1939 Pontiac Eight it is necessary to turn the housing slightly and work it around so that one end will slide over the frame cross member and not bind between the cross member and the toe board.

Because of manufacturing tolerance, this difficulty will not be encountered on some cars, but on others the housing may have to be forced past the toe board when removing and replacing. It is unnecessary in any case to remove the frame cross member to do this work.

Packard 359S

The 359S Packard 6 carburetor can be used on all 1937 and 1938 six cylinder Packards, as well as all 1939 Packard sixes except where the over-drive unit is used.

W1 and WA1 Spark Port Whistle

A new 38A-35 bushing, list 5c, is now available and should be used to eliminate the spark port whistle in W1 and WA1 Carter carburetors. Use new rivet.

Transmission and Rear Axle Lubricant

Only two lubricants are now needed to properly service the transmission and differential on all Pontiac cars through all seasons of the year.

FOR THE TRANSMISSION—Use a mild extreme pressure S.A.E. 90 lubricant in all models—Summer and Winter. (If a mild E.P. is not available, use S.A.E. 140 regular lubricant in the Summer.)

FOR THE REAR AXLE—Use only hypoid S.A.E. 90 lubricant in 1939 rear axles—Summer and Winter.

Use hypoid or mild extreme pressure lubricant in older model rear axles—Summer and Winter.

179-18 Cord Strip Shrinkage

Carter Engineering Department has released gasket 121-74, list 5c., to be used for service on any complaint of leakage between the thermostat coil and housing assembly, and the piston plate housing.

The new metal stamped cup used to retain the cork in the housing sometimes has a tendency to give the cork strip a permanent seat which prevents a tight seal at the piston plate housing. The new gasket will provide proper sealing.

Tie Rod Ends

Care should be taken when adjusting the toe-in on 1939 Pontiac cars to loosen the adjusting sleeve on each tie rod so that it moves freely and does not cock the tie rod end.

After the toe-in is adjusted, the tie rod ends should be parallel with the ground before the lock screws on the adjusting sleeves are tightened. When the tie rod end is permitted to operate in a cocked position the dust seals do not prevent the entrance of road slush and mud which causes rapid wear of the parts. Also when operated in a cocked position, only a part of the surface of the tie rod ball is in contact with the socket, resulting in rapid and uneven wear.

Buick—Form 4528-Carburetor 419S

11B-127S nozzle plug and gasket assembly has been superseded by 11B-126, list price 2c. 14-235 choker trip lever has been superseded by 14-249, 10c. 100-16 screw has been superseded by 101-21, 5c. 144-- throttle lever screw spring should not be used in conjunction with 101-121. 7-90 choker valve has been superseded by 7-113, 20c.



"—at 30 the light shows yellow, at 50, red—and at 65 the radio starts playing 'Nearer, My God, to Thee!'"



MOTOR AGE SHOP OF THE MONTH

Stepping to the fore this month is the Congress Garage of Kansas City. The views here show a portion of the shop equipment which, in all, represents an investment of about \$10,000. A *Motor Age* subscriber for ten years, the garage employs 27 men under the able guidance of Fred Warrick who this year assumed the presidency of the Automotive Trades Association of Kansas City. Mr. Warrick tells us the objective he is endeavoring to attain is personalized service and all the equipment necessary to deliver good service equal to the best car dealer in the city—these pictures indicate that he is well on his way.

THE READERS' CLEARING HOUSE

Service Men's Queries

MANY THANKS

As a conscientious reader and subscriber to the *MOTOR AGE* and an ardent admirer of your Clearing House Section, I would like to submit my initial contribution to the Clearing House, by offering my suggestion towards the solving of a problem of another subscriber that appeared in last month's issue.

I refer to the rear main bearing oil leak on a J.X.A. Hercules engine in a Diamond T truck, that has been a source of headache to George Chapman, c/o Collins Garage, 115 S.W. 2nd St., Miami, Fla.

What Mr. Chapman describes as a rear main bearing oil leak is really not an oil leak—coming directly from the rear main bearing, as he has

stated that a new main bearing was installed correctly.

The source of his trouble lies in the oil return holes located in the groove in the inside diameter of the flywheel housing. These holes become clogged with sludge causing the excess oil at this point (which is quite prevalent on force feed systems) to flow down the flywheel instead of returning back into the crankcase therefore making it appear that the oil leak is taking place through the rear main bearing.

The procedure to eliminate this condition is to remove the drive shaft, transmission, clutch, flywheel and flywheel housing. After flywheel housing has been removed, the oil return holes are plainly visible, although clogged, and should be thoroughly cleaned with high air pressure mak-

ing certain that these holes are open. Reverse procedure of assembling and job is completed. Samuel Kushnick, 2135 East 18th St., Brooklyn, N. Y.

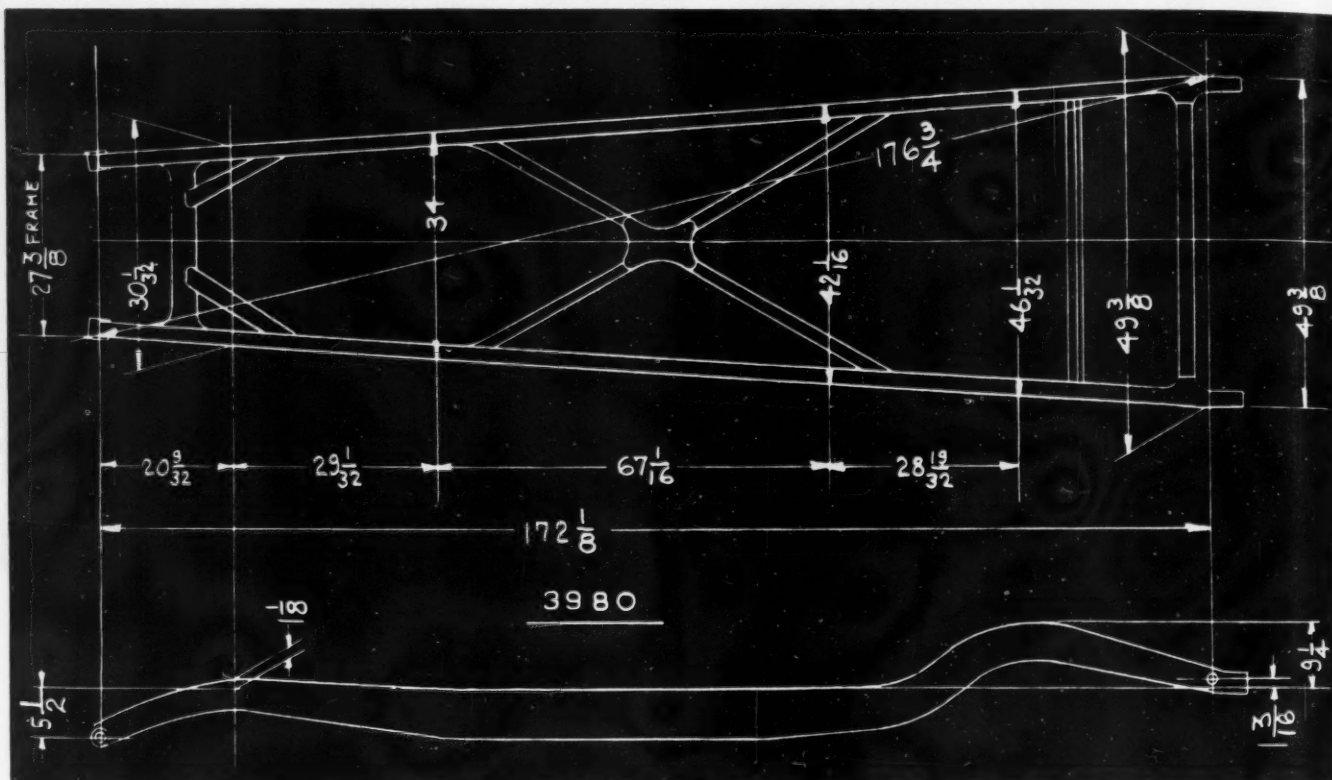
TRANSMISSION NOISE

I read the Clearing House problems and they sure are a help.

I have a 1934 Chrysler Six that is my own car and I am experiencing some trouble with the transmission.

I put in a new countershaft gear and at first the transmission worked fine. But now, there is a clicking noise in low gear and when you back up with the car, and let it coast back while having the clutch in, and then pull it out of gear, it makes a terrible

(Continued on next page)



(Continued from preceding page)

noise. It sounds like putting the car into second gear without using the clutch.

Also, I would like to have some information concerning this same car in raising the compression ratio. How much do you think I am able to plane off and what kind of plugs should I use? John Gollins, Lincoln Tourist Camp, R.D. No. 4, Bethlehem, Pa.

FROM the description you have given of the trouble you are experiencing on your 1934 Chrysler Six transmission, it would seem to me that you have the job of overhauling the free wheel unit on your hands. In addition, there is also the possibility that some of the gears—probably the

first speed gear on your countershaft cluster has become scored. I would suggest that you dismantle the transmission and check over both the free wheel unit and all the gears to make sure that they are O.K. and replace any parts that are worn.

In regard to raising the compression ratio on this job, you can plane off approximately .060 in. to .070 in. from the cylinder head. However, before removing any metal it is advisable to make a careful check to make sure that after the metal is removed that the valve won't strike the top of the cylinder head.

I can't make a guess as to the type of spark plugs you will have to use after raising the compression ratio but I note that the spark plugs used

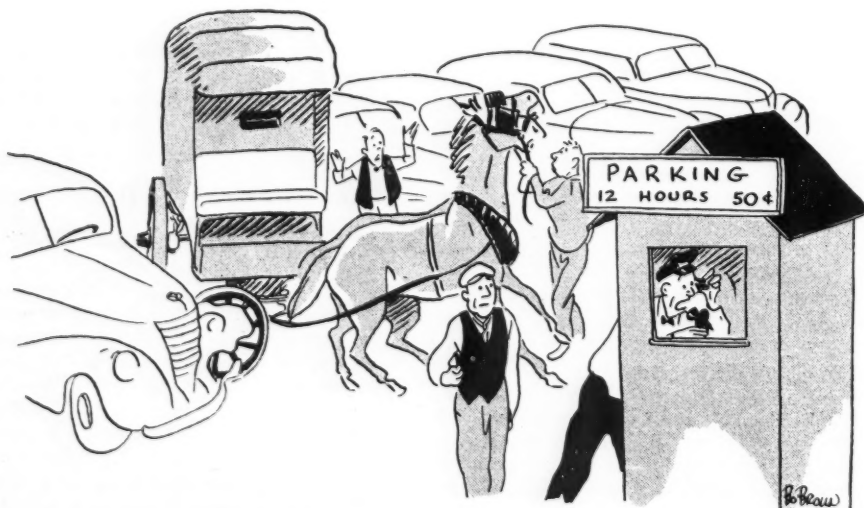
as standard equipment in the standard head is the AC-S9. With their aluminum cylinder heads with a high compression ratio they recommend AC-SL9. Quite probably the SL9 would prove satisfactory with your present cylinder head after planing it down approximately .060 in.

WHY DID IT STOP?

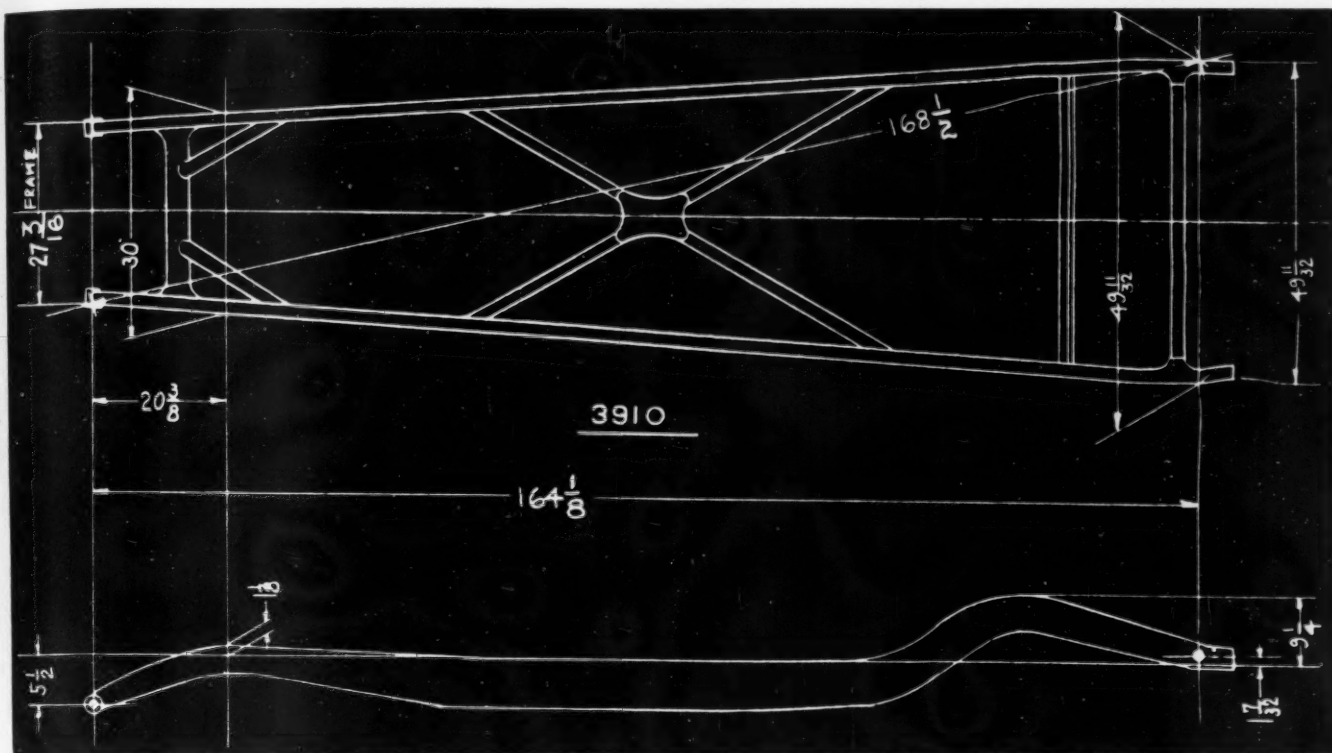
I have been reading MOTOR AGE for over a year and find all its articles very interesting and useful.

Recently I saw a 1936-37 Ford car which both developed the same trouble. The engine stopped occasionally while driving at ordinary road speeds. At night, all the lights went out. This trouble was caused by dirty or loose battery and cable connections. The generator was in good condition and the charging rate about 15 amps. or more. The fuel pumps were O.K. too as both cars ran all right without touching the pumps. Can you explain why these engines stopped when the cables became loose although the generator produced enough current for the ignition? Why didn't the bulbs burn out? George Van Damme, R.D. No. 5, Wallaceburg, Ont., Canada.

I BELIEVE the reason these engines stopped was that the engine speed was allowed to get down below the speed at which the generator would put out enough volts to keep them going. In other words, at normal driving speed the generator voltage would be sufficient to supply the engine through the coil but, when the engine speed was reduced, or, when a



"Boss, we don't hafta take hosses, do we?"



1939 Nash 3910 Frame Dimensions

shift was made in the transmission gears and the engine allowed to drop down to idling speed while the shift was being made, the generator output was naturally reduced momentarily and to the point where its output was not sufficient to keep the engines running.

The lights would not burn because there was not enough electricity left over from the ignition to carry the lights, but the bulbs did not burn out because at higher engine speeds the voltage regulator would hold down the voltage output and prevent it from being pushed into the lights.

CURES VAPOR-LOCK

Here is an easy one I am passing on to you for the boys. In the last week we have had some unusual hot weather. I had two cars come in that, when they were stopped, would not start again till car cooled. In both cases I found gasoline was percolating. If they started, they ran for a couple of minutes then quit. Remedy—took gas line from carburetor. Removed nut from line. Put a piece of electrician's loom over gas line. Made a swell insulation. Presto, trouble gone. Cliff Oppel, 128 N. Second Ave., E. Duluth, Minn.

MANY thanks for your suggestion on how to overcome vapor-lock. That is one that I hadn't heard of before and certainly seems simple enough. What many fellows do is to install a thick asbestos gasket between the carburetor and the manifold, the asbestos being $\frac{3}{8}$ to $\frac{1}{2}$ in. thick. Then, if that doesn't overcome the trouble, they make a baffle of some

sort around the fuel line. But, that electrician's loom stunt is pretty good.

Incidentally, it also helps at times to put a fairly thick gasket between the fuel pump and the crankcase but you have to take care that you don't put too much gasket there as it destroys the action of the pump.

CHECK ALIGNMENT

Have been reading through your trouble shooting pages for many years—never dreaming that I would have to call on you—but such is the case and here she is: 1938 Buick coupe arrived on its own power in shop with grind in rear end. Replaced side gears which were worn badly. Washed and carefully checked all other parts—none worn to speak of. Reassembled and placed on road—smooth operation for about two hundred miles. Back in shop with hum. Tore down and found rear shaft bearing gone. Replaced, checked and reassembled using all checking gages called for by your Flat Rate Book. And still the darn thing hums. How come? Jason Adamson, P.O. Box 101, Seaside, Cal.

WITH reference to the trouble you are having with the 1938 Buick rear axle, there are several possibilities that occur to me. The fact that this trouble has reoccurred several times after replacing parts, leads me to believe that the trouble will most likely be found in either a sprung rear axle housing or that the differential carrier is not true.

I would suggest that you mount the carrier in a lathe and check it with a dial gage to make sure that it is

true. In regards to the housing, if you don't have alignment equipment, I suggest that you take it to some alignment specialist and have him check the entire housing for alignment.

Of course, there is a possibility also that you slipped up in adjusting the pinion and ring gear but I am inclined to doubt that as a poor adjustment would result only in a hum and not the excessive wear you are experiencing.

Another point to check would be the end play of the rear axle shafts.

While you are at it you might also check the radius rods to make sure that they maintain the rear axle assembly in proper alignment.

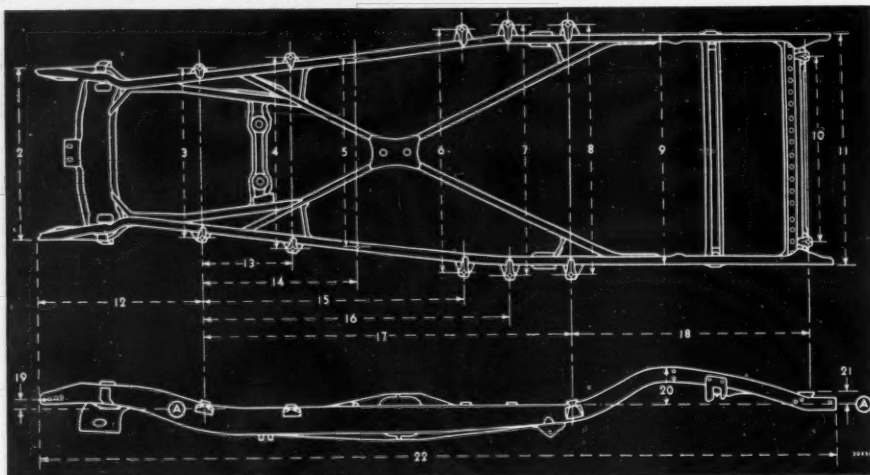
STICKING VALVE

I receive your MOTOR AGE magazine every month and enjoy it a great deal. I have a question—if you could give me any information on it I would greatly appreciate it. I have a 1934 Dodge Model DR which has a slight buck in low speeds. This trouble comes and goes as it pleases.

I have tested and installed new points, condenser, coil, fuel pump, carburetor, rotor, distributor cap, wiring and almost anything else I see. The distributor cam is new. I have grounded the distributor housing, installed new battery terminals, rechecked valve adjustments, have good compression (110-120) on all cylinders, installed new spark plugs, of course, and car idles smoother than any car on the road. It runs fine!

Every once in a while (in any gear) when you give it the gas, it bucks un-

(Continued on next page)



1939 Chrysler C-24 Frame Alignment

Dimensions given in			
A—Top line of frame	6—53% ± 3/32	12—52 11/16	18—875/16
2—35 29/32	7—None	13—51 1/16	19—51 5/32 ± 1/16
3—35 29/32 ± 3/32	8—53% ± 3/32	14—14%	20—2 1/8
4—38% ± 3/32	9—49 1/16	15—33%	21—8 ± 1/8
5—43% ± 3/32	10—40 1/8 ± 1/16	16—58 3/32	22—23/32
	11—49 1/16	17—None	23—192%

(Continued from preceding page)
 til it picks up a bit then runs along nicely. It doesn't do it all the time. It seems to do it more when the car gets warmed up. The car does not burn any oil what-so-ever. If I set the time back or advance it any it doesn't help. This car gives exceptionally good gas mileage. Leonard Friedman, 521 Wahill Road, Brooklyn, N. Y.

JUDGING from your description of this condition and from the work you have done, I am inclined to believe that this trouble is caused by a sticking valve. Such a condition would be particularly noticeable when the engine was hot and would occur usually on a low speed pull. I believe a carbon and valve job, paying particular attention to cleaning out the valve guides and cleaning off the valve stems, will correct this trouble.

Don't overlook the possibility of worn bushings on the distributor shaft. If there is an excessive amount of play it will produce very erratic running, particularly at low speeds.

MAIN BEARING OIL LEAK

Have you any dope on Ford BB 1932 leaking oil from rear of engine? A regular stream comes through hole in flywheel housing. The pan has been down several times, bearing looks O.K. When the case is dropped the oil streak looks as if bearing was leaking around the shaft. Truck uses about 8 qts. a day. No need of any road oiler wherever it is used. H. R. Maxfield, New Hartford, Conn.

EITHER this bearing is extremely worn or there is a terrific amount of pressure being built up in the crankcase causing this leak. As you know, the oil is supplied to the main bearing but not under pressure so it cannot be forced out of the bearing in that manner. Be sure that the main bearing oil return pipe to the crankcase does not extend down into the oil. This pipe should be cut off, if necessary, so that the end is at least an inch above the oil level in the crankcase.

I would make a particular point to check the crankcase breather cap and pipe to be sure there is no obstruction and that it permits the crankcase to breathe freely. The action of the four-cylinder motor tends to create a breathing action and this, of course, is increased greatly if there is a considerable amount of blow-by from poorly fitted rings. The breather pipe and cap should be free to permit a release of this pressure which, no doubt, is largely responsible for the excessive consumption by way of the rear main bearing.

These two points, the oil return pipe and the crankcase breather pipe, are, I believe, the ones you will have to check in this particular case. We are assuming that the bearing itself does not have excessive clearance, but, if there is any doubt on this point, it should be checked.

LAZY GENERATOR

I have been experiencing trouble with the generator of a 1936 Dodge truck.

Although the generator appears to be in good condition, it will not charge more than 4 amps. regardless of where the third brush is set. Can you tell me what is wrong? Floyd S. Kerslake, Clinton Garage, 2609 S. E. Clinton, Portland, Ore.

I AM inclined to believe that you will find the trouble caused by high resistance somewhere in the field circuit of the generator. In this connection, I would pay particular attention to the condition of the commutator and brushes. Make sure that the commutator is not grooved and also that the brushes operate smoothly in their guides. There is also a possibility that the trouble is caused by a defective coil in the armature which can, of course, be checked by placing the armature in a growler.

CARBURETOR GOES DRY

I am writing with regard to gasoline trouble on a LaSalle 37-50 sedan. The trouble is lack of gas in the carburetor. If it is not started often or left standing for some time there is difficulty in starting the engine. It will start promptly if you squirt gas into the carburetor air intake. There is no trouble in the automatic choke as when the engine is cold the choke is completely closed.

The battery is new, coil and condenser check O.K. Plugs checked and cleaned. Everything is O.K. after it starts but if it is left in the garage for any length of time the carburetor seems to go dry. Any information you can give me on this will be appreciated. Blake Wagner, Blake's Garage, 175 Main St., Fredericktown, Ohio.

THERE are several possibilities that might be the cause of your trouble. First of all, you might have a



"I had to hurry, officer, I was about to run out of gas!"

defective fuel pump which permits the fuel to drain back into the tank and in that way the carburetor is starved after setting for a time. The next suggestion is that the jets in the carburetor are loose and leaking at the base. I suggest that you remove the jets, install new gaskets and then replace the jets making sure that they are tight.

My final suggestion is that there is trouble in the automatic choke and while you say that it is closed tight, I would double check this just to make sure. However, I am most inclined to think that you will find the trouble in a defective fuel pump or in leaking carburetor jets.

KEEP ON TURNING

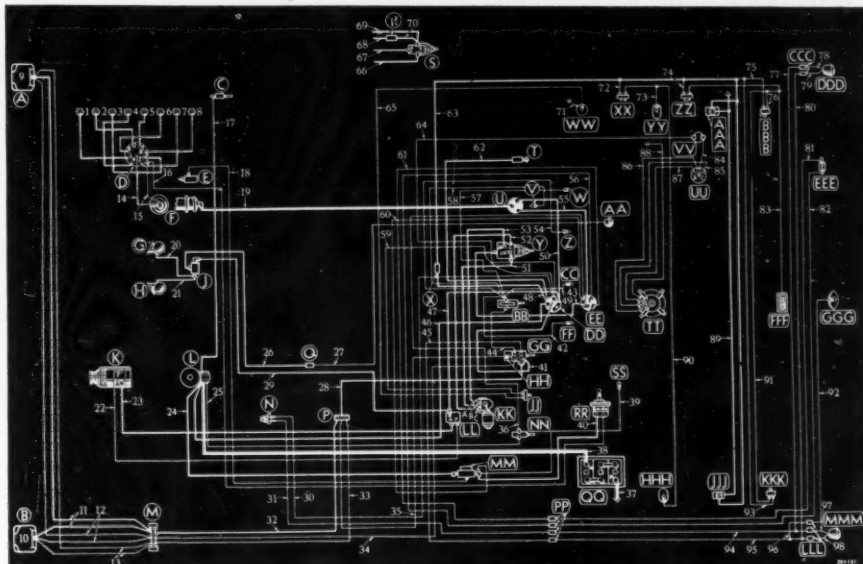
Kindly advise how to overhaul 1937 LaSalle 50 rear end-replacing ring and pinion gear and bearings (Operation R9). We have differential gear cover removed from car and are unable to get ring gear and bearings out. Hardy Richardson, 500 S. Washington St., Alexandria, Va.

THE difficulty apparently is in getting the carrier bearings out. You no doubt have noticed that the carrier bearing adjusting sleeve turns out about four turns and then appears to hit something and will not come any further. It will come out, however, but it requires a long-handled wrench to keep forcing it out. Just don't be afraid of it, but keep on forcing it and the adjusting sleeve will come out all right.

STARTER SORROW

I am a reader of the MOTOR AGE. I have trouble with a Ford V-8 starter. About a year ago I put in a new flywheel gear and a new Bendix drive. Ever since that time this man has had trouble with his starter making a loud bang. When the motor starts off it sounds as if the Bendix does not release from the flywheel. The starter just chatters for that second. Now he has come in with the gear and the Bendix shot again. I also replaced the armature because that shaft was bent, but nothing seems to help. Could you give me any advice on this? Al Luecks Garage, 1600 N. 8th St., Sheboygan, Wis.

ON the trouble you are experiencing with a Ford starter, I am inclined to believe that either the ring gear was placed on the flywheel in the wrong position or, that it is not running true. I suggest that you mount a dial gage on the flywheel housing and check the rotation of the flywheel ring gear to make sure that it is true within approximately .006 inch. There is also a possibility that the housing is sprung—resulting in misalignment between the starter and the flywheel. I suggest that you check both of those points and, if necessary, install a new flywheel ring gear or a



1939 Chrysler-C-24 Wiring Diagram

- | | | |
|---|---|---|
| A—Headlamp—right | EE—Fuel gage (panel unit) | FFF—Reading lamp |
| B—Headlamp—left | FF—Instrument lamp—left | GGG—Rear license plate lamp |
| C—Automatic choke | GG—Head and tail lamp lighting switch | HHH—Pillar lamp—left |
| D—Ignition distributor | HH—Headamp bright beam indicator lamp | JJJ—Cigar lighter—left (rear compartment) |
| E—Overdrive solenoid switch | JJ—Front compartment lamp switch (Limousine only) | KKK—Automatic door switch—left |
| F—Ignition coil | KK—Windshield wiper motor | LLL—Tail, signal and rear license plate lamp cable connectors |
| G—Horn—right | LL—Generator voltage regulator | MMM—Tail and signal lamp—left |
| H—Horn—left | MM—Overdrive solenoid relay and fuse | 1-8—Spark plug cables (high tension cable) |
| J—Horn relay and fuse | NN—Starter switch | 9—Headlamp cables and sockets—right |
| K—Generator | PP—Cable connectors | 10—Headlamp cables and sockets—left |
| L—Starter motor and solenoid | QQ—Storage battery | 11—Red (lower filament) |
| M—Headlamp wiring terminal block | RR—Overdrive solenoid switch | 12—Yellow (auxiliary bulb) |
| N—Signal lamp switch | SS—Overdrive solenoid indicator lamp | 13—Black (upper filament) |
| P—Headlamp dimmer foot switch | TT—Phone receiver (Limousine only) | 14—Secondary cable (high tension cable) |
| Q—Horn ground cable connector | UU—Phone microphone (Limousine only) | 15—Primary cable (black) |
| R—Windshield wiper feed cable fuse and connector (first type) | VV—Phone switch | 19—Ignition lock switch cable |
| S—Windshield wiper switch (first type) | WW—Front compartment lamp | 66—Brown (to "C" terminal on windshield wiper motor) |
| T—Cigar lighter (front compartment) | XX—Pillar amp switch | 67—Green (to "A" terminal on windshield wiper motor) |
| U—Ignition switch and lock | ZZ—Reading lamp switch | 68—Red (to "IGN" terminal on fuel gage panel unit) |
| V—Ignition switch lamp | AAA—Cigar lighter—right (rear compartment) | 69—Red (to "B" terminal on windshield wiper motor) |
| W—Speedometer lamp—right | BBB—Automatic door switch—right | 78—Red (to signal lamp) |
| X—Body wiring feed cable fuse and connector | CCC—Tail and signal lamp cable connectors | 79—White (to tail lamp) |
| Y—Windshield wiper switch and fuse (second type) | DDD—Tail and signal lamp—right | 97—Red (to signal lamp) |
| Z—Speedometer lamp—left | EEE—Fuel gage (tank unit) | 98—White (to tail lamp) |
| AA—Horn button | | |
| BB—Instrument lamp switch | | |
| CC—Instrument lamp—right | | |
| DD—Ammeter and circuit breaker | | |

new flywheel housing so as to get proper alignment between the starter and the ring gear.

JUMPS OUT OF GEAR

I have a 1936 V-8 Ford which has been driven 50,000 miles. Recently, it jumps out of second gear going down hill. Can you give a remedy for this? Hal's Body & Fender Shop, 478 1st St., Hayward, Cal.

YOUR trouble is probably the result of wear or looseness in the second gear sliding shaft. If the wear

is not excessive, the trouble can generally be corrected by removing the transmission cover and driving out the pin that holds the second gear shift rail in place. Take the rail out of the cover and grind or file a notch in it directly opposite the present second gear notch. The new notch should fit the contour of the shift lockball. Reassemble the rail to the transmission cover.

Then, obtain an extra shift lock ball and spring and cut the rounded end of the shift lock off. Next, cut

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three coils off the spring and remove the plug from the transmission cover and insert the extra shift lock ball and spring in the plug hole. In other words, what you have done is to install an extra shift lock ball which will serve as an auxiliary unit to prevent the second gear from slipping out of mesh.

If this does not overcome your trouble, it will be necessary to install new parts.

LOW OIL PRESSURE

I happen to be a subscriber to MOTOR AGE and would like some information on a 1928 Studebaker Regal. First, can you give me any dope on the carburetor which happens to be a Ball & Ball make?

I have two 1931 Studebaker sizes and one 1931 Dictator eight and the 1928 Regal mentioned above, and I have had trouble with the oil pump on all of them. Can't get them to pump enough pressure. Any help will be appreciated. Earle Powers, R. 3—Box 254, Hemet, Calif.

WITH reference to your request for carburetor information on the Studebaker Regal, will you please let me know whether this was a Dictator, Commander or President chassis. Incidentally, the carburetor used as standard equipment was not Ball and Ball but Stromberg on the Dictator and Commander—while the President used a Schebler unit.

In regard to the oil pump—from the description you give of the trouble it is quite possible that your difficulty is not in the oil pump but in the bearings. If the bearings have become worn, they will leak oil to such an extent that regardless of how good the oil pump is, it will be unable to build up any pressure.

I suggest that you make an oil pressure test on this engine as described in the article which I am sending you and then, after you have reconditioned the bearings and, if necessary, the crankshaft, it is more than likely that your oil pump will be satisfactory.

If it isn't, replacing the gears and lapping down the cover should overcome your trouble.

WHEEL BEARING WORN

I am having considerable trouble stopping grease from leaking on the rear wheels of a 1935 Model 60 Buick. I have installed new retainers and gaskets several times. The drain tube is open and I have drilled a vent hole in the housing to relieve pressure. The grease is at the proper level. The roller bearings in the wheel are worn about .005 in.

The leak is just bad enough to soak the brakes in about two weeks' time so they will not work properly. It seems that the grease, instead of dropping

off the slinger into the drain rough, capillaries up the slinger and onto the drum when the car is standing at a slight angle (sideways).

Any help I can get on this problem will be greatly appreciated. Blaine Griffith, Griffith's Garage, 425 Sioux City, Sioux City, Iowa.

THE only cases of this kind with which I am familiar are instances in which excessive wear in the wheel bearing has allowed enough play to excessively wear the oil slingers. With the oil slinger worn there is nothing to prevent grease from going out on the brake lining. My suggestion in this case is, therefore, that you first install new wheel bearings along with new grease containers and oil slingers. I believe this will correct your trouble.

WATER DISAPPEARS

I am having trouble with 1936 standard Chevrolet radiators. It seems after driving 15 or 20 miles, about 1 gallon of water has disappeared.

I am also having trouble with 1936

and 1937 Chevrolet rocker arms getting dry. There seems to be plenty of oil getting to the top but one or two arms get rusty at the push rod end, resulting in wear and noise. Would worn bushings or shafts let the pressure leak out, thus starving one particular rocker arm?

I have read a number of good hints in MOTOR AGE, and I hope you can help me in solving these problems. John Chauvin, Malone, N. Y.

ON your 1936 Chevrolet that keeps losing water, I believe your trouble is caused by a partly clogged radiator. In other words, the water pump pumps the water faster than it can pass through the radiator, consequently it piles up in the upper tank and spills out the overflow. A thorough cleaning of the radiator should overcome this trouble.

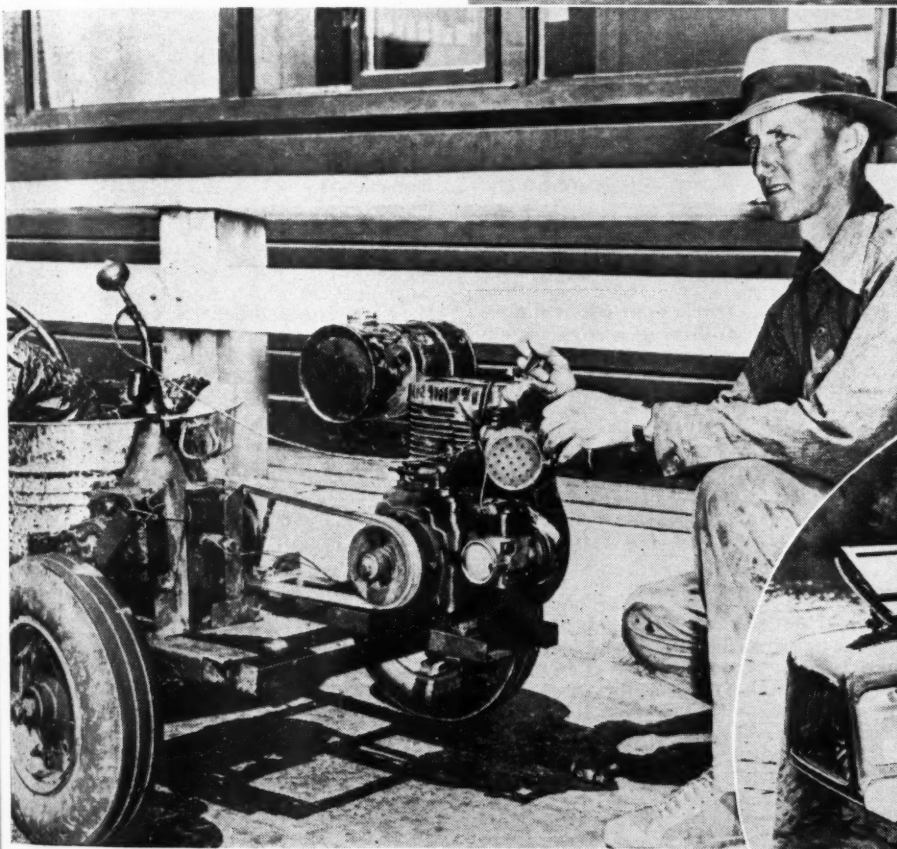
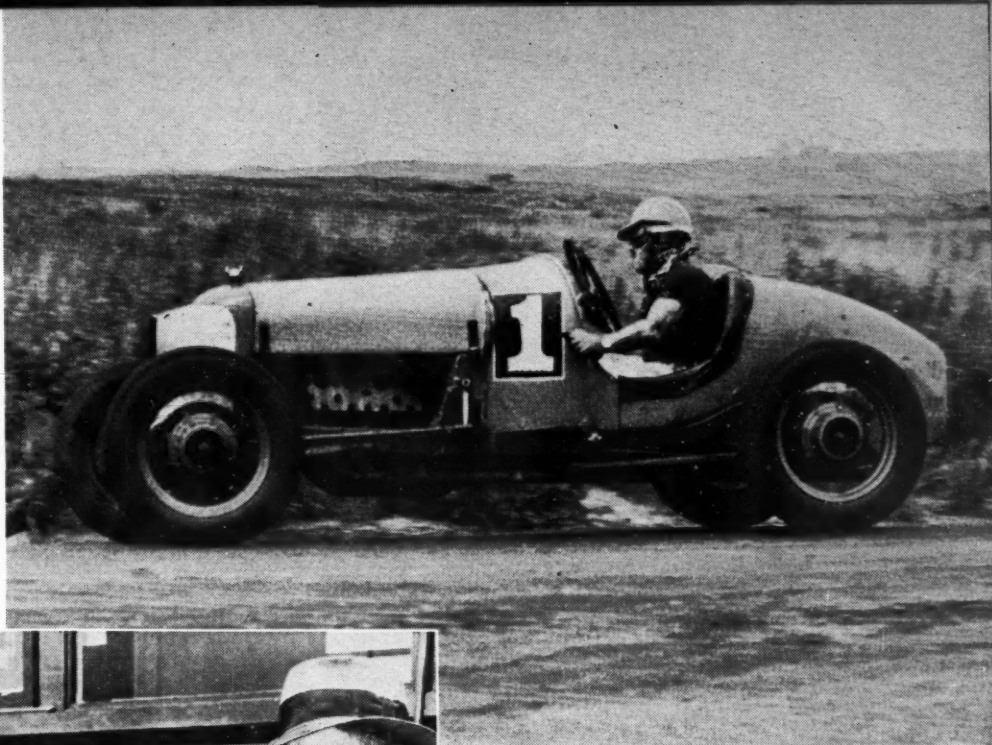
With reference to the dry and rusty rocker arm, remove the rocker arm and shaft and thoroughly clean out all the accumulated sludge. Also, clean out the oil line going up to the rocker arm. If this does not completely overcome your trouble, adjust the oil pump to give more pressure.



"She's something to write home about, all right, but if I did . . . WOW!"

(Right) Lemuel Ladd of Boston rounding the first turn of the recent 60-mile road race at Montauk, Long Island. Ladd's Ford special beat a field of sportsmen drivers piloting foreign cars over a course of two miles.

(Below) One 2-hp. engine, two wash-tubs and four wheels brought Herman Litrell 2500 miles from Elm Springs, Ark., to the San Francisco fairgrounds. The new version of the "Arkansas Traveller" is shown with his "Jitterbug Special" after his 17-day trip.



(Circle) Designed like an automobile without wheels, this new type of motorboat was tested recently on the Thames at Isleworth, near London. Powered by a 9-hp. engine it is capable of a speed of 35 m.p.h. The craft has been submitted to authorities for approval as a police boat for emergency work.



(Left) Car Wood, Jr., son of the famous motorboat racer, winning one of the class B heats in the International Outboard Speedboat Regatta held at Milwaukee. Wood recently won both heats of the B amateur class, his fastest time being over 40 m.p.h.



FLAMES

In this spectacular blaze near McPherson, Kan., two men escaped injury when their gasoline truck went up in flames following a surprise explosion on the highway.

Are You Paying for a New Air Compressor?

Keeping the Old One to Its Last Gasp May Not Be Cheaper

Sometime ago a service station operator wrote to a manufacturer after he had replaced an old air compressor with a new one. He said something like this: "... although we are requiring it to deliver about 20 per cent more air at 25 to 30 pounds higher pressure than our previous unit, we found that our electric bill for the last month was approximately 18 per cent or over \$4.00 less than for the corresponding month last year with our old compressor."

And so it goes. Maybe many of us are paying for a new compressor while operating an old worn out unit. And this goes for all other kinds of equipment as well. Service jacks, for instance, are something to think about the modern speedlined, streamlined hydraulic jacks that can get away down under and shove cars up very high, and quickly, should be near the top for the check-up on old equipment that should be junked.

Getting back to compressors for a moment—they are so important in shops because of the many air-operated tools and equipment—here's what a new one will do.

Cost less for power.

Save labor and prevent wasted time waiting for air.

Need no upkeep or repairs.

Speed up work.

Cut job costs to a point where profit can be made under competition.

Hold and please customers by quicker and better service.

(When there's no air to operate the lift because other air operated devices are in use, or when the air chuck has insufficient pressure to inflate tires properly, a customer's respect for the station dwindles and he goes elsewhere the next time.)

Eliminate overload and "heating."

Eliminates noise. (A modern compressor is much less noisy than an old type even when it was new—but the average old "junker" in a shop today sounds like a riot.)

Be an actual source of pride as well as a builder of good will and prestige because of its clean, modern appearance—fit into the modern shop or lubritorium—harmonize with modern station interiors.

Provide ample air supply for all present day needs. Air is such an efficient and inexpensive source of power it is foolish not to take full advantage of it. There must be enough capacity available to operate several tools at once if the shop is to be truly efficient.

Produce cooler air—drier air. (Dry air is imperative in paint spray work.)

Permit more convenient and frequent removal of accumulated water.

Provide higher working pressures for modern requirements without overload or undue heating.

Pay for itself in power and labor savings.

So, be sure you're not paying for new equipment by trying to make the old do.

Valvoline Develops All-Purpose Lubricant

"The more you see of the many, the less you can settle to one," might be true in Kipling's poems; but it certainly isn't so in the welter of specifications for gear lubrication. The lubrication business would be heartily glad to settle to one.

Standardization has been needed and seems to be making headway with the announcement of a new all season, all purpose gear lubricant developed by the Valvoline Oil Company. The new product will be marketed under the trade name of Valvoline "X-18"—said to be the only lubricant needed every day a year for overdrives, transmissions and differentials, summer and winter.

Under the new system, one package takes the place of eighteen summer and winter lubricants. Those replaced are: Gear Oils—SAE 80, 90, 140, 250. Extreme Pressure Gear Oils—SAE 80, 90, 140, 250. Straight Gear Oils (heavy duty)—T090, TI(140), TIW (140 light), T2(250). Special Hypoid Lubricants—80, 90. Steering Gear Lubricants—110(1), 160(2). Worm Gear Lubricants—110, 160.

Available in 25-, 100- and 400-lb. drums, the new lubricant will necessitate fewer gun and drum changes, thus cutting down on the amount of time used per lubrication job; allowing more jobs to be put through the grease rack each day.

A big feature of this new product from the standpoint of the automobile manufacturer and the motorist is that the danger of misapplication of greases and oils will be lessened materially because of simplification. It is pointed out by the maker that losses caused by seasonal changeovers will be eliminated, as there is no longer any need for summer and winter types.

Wilkening Appoints Calhoun

Appointment of David R. Calhoun as manager of its industrial division



D. R. Calhoun

has been announced by Wilkening Manufacturing Co., Philadelphia, maker of Pedrick Heat-Shaped piston rings. Dave Calhoun has been in the Pedrick engineering department for several years. During the past two years he has been responsible particularly for service engineering in connection with field

sales and has traveled extensively.

Announcement was also made by Wilkening Manufacturing Co. of the promotion of Webb Pedrick to the position in the engineering department made vacant by the promotion of Dave Calhoun. After several years experience with Pedrick Machine and Tool Co. of Philadelphia, Webb Pedrick joined the Wilkening organization in 1936 and has been engaged since then in the experimental and research division of the engineering department.

Tire Dealers Fight Cut-Price Advertising

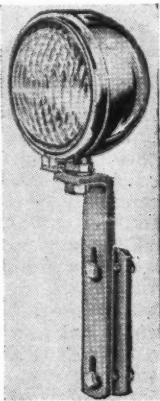
Independent tire merchants, just preceding the Fourth of July holiday, put a quietus to major tire manufacturers' cut price advertising by filing injunction suits and also suits for damages. The main action centered in Atlanta, Ga., but had its effect nationally. Cut price advertising threatened to undermine the tire industry's price stabilization program, but first line tires remained practically immune with the price cutting being confined to second and third lines which are in price competition with private brand tires of oil companies and mail order houses.

In Atlanta independent dealers obtained their injunction in superior court against major manufacturers on the ground that their advertising was false and misleading in that the announced price levels from which the reductions were made, were fictitious and were above the true original prices. The dealers asked damages from the defendant manufacturers. This is the first time on record that dealers have enjoined manufacturers from cutting prices or running price-cut advertising. Prices firmed up immediately after July 4, with little damage done to the leading tire lines.

Manufacturers report that replacement sales for the first six months exceeded 16,000,000 units as against less than 13,000,000 in the first half a year ago. With consumer tire buying continuing to run ahead of a seasonal pace they now see a 33,000,000 unit year as a certainty. Manufacturers stocks are slightly higher than a year ago, but are not top-heavy. The manufacturer sales values of tires and tubes and tire sundries shipped in the first quarter of 1939 was \$87,781,000 against \$87,102,000 a year ago and \$60,384,000 in 1937. May tire shipments were 4,753,405 units—an increase of 9.1 per cent above April and of 44.4 per cent above May figures for 1938. May production totaled 4,418,072 units against 4,211,152 in May of 1938 and 2,662,623 in May of 1937. Inventories at the end of May were 9,918,759 casings against 9,997,527 a year ago.

Back-Up Light

Safety lighting is a popular subject of discussion, and light when backing up is equally important. Yankee Metal Products Corp., Norwalk, Conn., has developed a new back-up light that has been carefully designed to give a maximum spread of light. Attractively finished in either chrome, or black with a chrome rim, the new light is supplied with a bracket which permits mounting in any desired position. Write the manufacturer for further information and prices.



—AND FLAMES

A one-legged motorcycle driver of the "Suicide Legion," trick riding show, drives at top speed through a blazing tunnel of fire, a lane of flames 20 feet long.



Battery Prospects from Registration Lists

Personal Contact Sells Many for This Small-Town Dealer

Frank Dore, of Weatherford, Texas, sells a lot of automobile batteries. The reason he sells so many batteries is that he has found car owners respond favorably to personal contact, both by telephone and personal calls.

Tire and battery dealers long have found a list of automobile registrations important in soliciting business, especially by mail. Mr. Dore has gone a step further with the use of car registrations. He uses the list to find battery customers by personal contact.

By studying his list, he is able to determine, in a surprisingly high percentage of cases, what car owners need batteries and when they need them.

Finding that batteries were paying him a nice profit, Mr. Dore began systematically to study his registration list. "Here is a man who has a car he bought new two years ago," he said to himself. "It ought to be about time for him to buy a new battery."

Finding such a prospect, he writes the owner's name down, his address and his telephone number if he is listed in the local directory. He continues through the registration list until he selects a score of names.

Then he begins a systematic canvass of these names. He knows nine out of every ten persons so listed, personally. Knowing them, he knows whether it is more practical to go out

and see them or call them on the phone. Then he acts.

"When I contact the car owner," Mr. Dore explains, "I tell him that his car battery has been in use more than two years, or whatever time it actually has been in use, according to the registration list, and I explain that the battery now has reached such an age that it may go out on him at any time. I point out the danger of driving with an unreliable battery, especially on road trips, and ask him to bring his battery in for an inspection."

"I tell him that if the battery still is serviceable, we will do whatever work is necessary on it, if any, to assure still more reliable service; and if it isn't reliable further, we will give him the usual trade-in allowance on a new battery."

Mr. Dore finds this plan the most practical he has ever used to sell batteries when apparently there is no demand for batteries. He can always dig up battery business by resorting to this method.

"Naturally, early fall is the best time to work this plan," he says, "because I have an added talking point of getting the car ready for the heavy demands on the battery during winter; but it is good at any time. Spring offers another special opportunity to stress the importance of battery check-up, to get the car ready for vacations and other long summer driving."

Invasion

(Continued from page 13)

As previously mentioned, several American cars were actually quicker by the lap, but in the race their unfavorable riding and handling qualities resulted in tire wear and driver fatigue which deprived them of the winning position.

Aside from the excellence of its chassis, the victorious Maserati also gave proof of a durability unexpected in American racing circles. Examination following the race revealed no failures, actual or incipient, of any parts. In fact, members of

the Boyle mechanical staff feel the car could competently and safely complete another 500-mile race without further attention. In the past, foreign cars at Indianapolis have been regarded as lacking stamina for the distance, and this evidence to the contrary was a surprise to quite a few American followers of the sport.

Aside from the addition of reserve oil and the fuel tanks, no changes of consequence were needed to prepare the Maserati, and it may be said to have started the race practically as received from the manufacturer. Very few instances of such readiness to race on the part of a brand new car are recorded in American racing history, but it seems to be a common-

place state of affairs in European competition. In support of this statement may be mentioned the achievement of the German Mercedes organization in the recent Tripoli race.

This year's Tripoli event was run under a suspension of the International Formula, the Italians evidently believing that they could produce a national victory by the expedient of excluding the invincible German formula cars through restricting engines in 1939 Italian races to 1½ liters, a type with which they've had much experience. However, the Mercedes people, who strenuously denied having any 1½-liter cars at all up to within a few days of the race itself, descended upon a horde of luckless Italian competitors with a pair of spanking new 1½-liter engines and cars to match and mopped up first and second places without ever relinquishing the lead!

Two cars only, brand new and untried, no time to experiment if necessary, and Mercedes scampered home with first and second! Quite a testimonial to German methods and confidence; one which cannot be overlooked. As a matter of cold fact, the German machines, whatever their size, are quite superior to the Maserati as the latter is to our American cars, and the Germans will not take kindly to the prospect of their Italian compatriots pulling another Indianapolis victory out of the hat in 1940.

Damaging as it may be to our national pride and traditions, it is necessary to admit the forebodings of American observers for future races are well founded. If Mercedes and Auto-Union, as now seems likely, come to Indianapolis next year, our present American equipment will be hopelessly inadequate to deal with them.

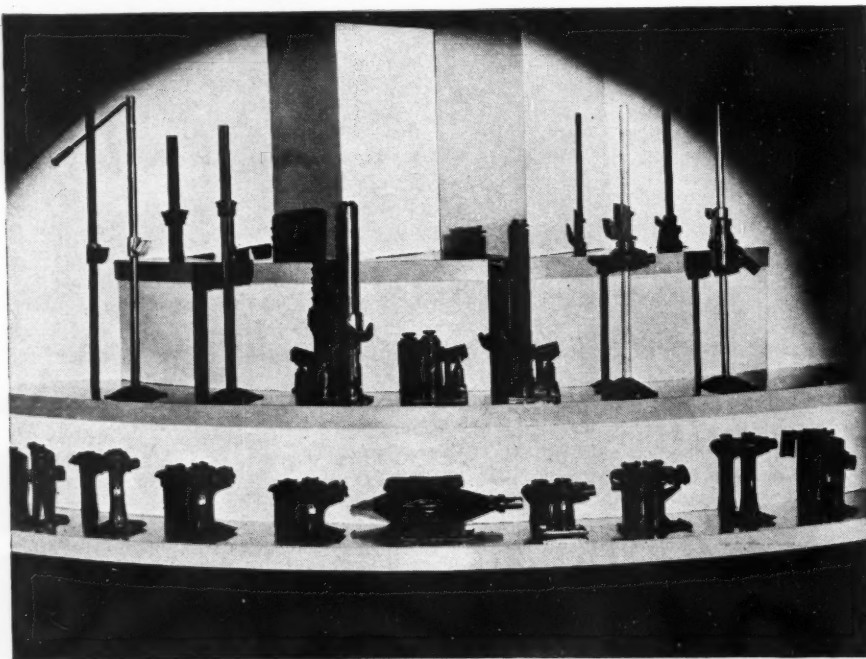
This admission requires some explanation, as it is possible the exact nature of the European racing programs is not thoroughly understood in the United States. Mercedes and Auto-Union in Germany are known to enjoy government subsidies in addition to the huge amounts spent on racing by the firms themselves. Some subsidization is probably given Italian racing organizations but it is not openly admitted.

Lacking substantial subsidies, and without support from large manufacturers, French and British competition under the present formula is almost non-existent, and the future bears little promise of improvement in these countries, a fact greatly to be regretted since the British especially have done remarkable things in the way of obtaining high power outputs from very small engines.

However, with large sums of money available, German and Italian racing authorities have succeeded in developing engines of extremely high performance. Mercedes' 3 liter has an output of 420 hp. at speeds nearing 8000 r.p.m.; Auto-Union has not released any figures, but is certain to have almost the equivalent of Mercedes. Maserati foots the list with a claimed 350 hp. at 6500 r.p.m. for the car Wilbur Shaw drove at Indianapolis.

No less attention has been devoted to chassis design, and both Germans and Italians have arrived at unbe-

AJAX



28 GREAT PORTABLE JACK "BUYS" HYDRAULIC AND MECHANICAL—3/4 TO 12 TONS

● Before you buy—see Ajax. Shown above are just a few of the powerful and profitable numbers now on display in your jobber's showroom.

Every model built to take it . . . and priced where you like it. Backed by all the jack-building experience and engineering know-how of the famous Ajax name.

Before you buy—see your Ajax jobber.

AJAX AUTO PARTS COMPANY • RACINE, WISCONSIN

A JACK FOR EVERY AUTOMOTIVE NEED

lievably efficient types of chassis for holding the road at high speeds. Excellent riding and control have been obtained by intensive experiments with soft springing, using both torsion bars and coil springs.

Both countries employ their automobile racing activities as instruments of policy, using them to extend prestige abroad by piling up performance records attesting their national invincibility. Their manufacturers have successfully used these records in foreign advertising to bolster automotive exports.

Both nations draw upon motor racing for other purposes as well. Germany, for example, after the advent of the present government, set out to obtain research data for high performance aircraft engines, limited to this subterfuge by the terms of the Versailles treaty, at that time unrepudiated. To what degree the Germans were successful in this effort we are only now beginning to understand, but it is highly significant that the German pursuit plane holding the present world's speed record of 460 odd miles per hour is powered with an engine built by Mercedes-Benz, to date the protagonist in Germany's astonishing motor racing accomplishments.

This article is certain to draw criticism at this point for what is apparently undue emphasis on German automotive superiority. No such emphasis has been intended, and none but the most general facts have been presented in support of the opinions advanced. Actually, it is difficult to minimize the present advantage which Germany has built up in racing design.

Their current edge on the world in this respect is so broad that it is only wisdom to face the fact, even while mentally resolving to see whether something can be done about it. Here it may be asked why the Boyle interests did not purchase a German car instead of the Maserati. The answer is simple. The German machines built to present International Formula are not for sale. Nor are the Italian Alfa-Romeos.

At this writing, the only formula car which has been available on the market is Maserati's, and it is doubtful whether that firm would release another car now, having realized its expressed intention to win the 1939 Indianapolis race with the machine sold to the Boyle organization.

No racing cars of modern European Grand Prix type have yet been produced in the United States, and the Boyle interests purchased a Maserati only after it became evident the cost of building a conventional American design of high quality would be greater than the expense of importing the Italian machine. In other words, no highly developed racing automobiles capable of competing with European machines under the current International Formula are now available in our own country at any price.

Whether anything can and should be done to remedy this situation in the face of an almost inevitable German-Italian invasion in 1940 is at present a matter of conjecture. Only one thing is certain—the American racing fraternity is in no condition to supply an answer unaided. Of recent years, racing in this country has

been carried on almost entirely by individuals, lacking adequate financial and technical backgrounds in many cases. Its entire resources and personnel, if they could be coordinated, could not measure up to the task of producing an American design forceful enough to challenge German-Italian dominance under the Formula.

The obvious solution requires a much stronger basis. British racing enthusiasts have begun an approach to the problem during the past year by agitating for a fund of half a million pounds, to be raised by voluntary contributions from the industry and various individuals. This sum is

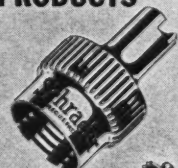
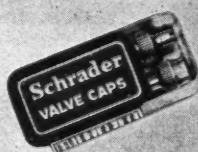
to be turned over to an organization formed to design and build the cars, and all the research data and equipment of the entire British automotive industry is supposed to be available to the group. To date, this plan has made little actual headway. The French have enlisted some small government support for potential Grand Prix construction. This backing in the form of a very modest subsidy prize granted the winner of an official competition held last year, is at present enjoyed by Talbot. This firm has produced two Grand Prix designs for 1939, neither of which has so far proved very competitive. Individuals

(Continued on page 48)

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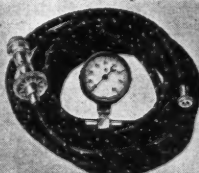
DEALERS WHO SERVICE TIRES NEED THESE PRODUCTS



Buy 50 or 100 Schrader
Cores or Caps in metal boxes and
you get a display container.



Schrader Tire Gauges—a complete
line for service and resale.



Spark Plug Tire Pump
Profitable To Sell.
Operates from auto,
truck, or tractor motors.
Saves time and work.

You can easily make dime after dime, dollar after dollar, by replacing the Valve Cores and Caps on every tire repair job. Start this tested plan now. Make these replacements a part of your service.

A new Schrader Core and Cap in each repaired tube makes a completely reconditioned job. Replacing missing Valve Caps at the air stand gives you profits from your "free air", often a quarter at a clip.

You don't have to make excuses when you use genuine Schrader Cores and Caps. Their fine quality is known to everyone.

GET PAID FOR THE
REPLACEMENTS
YOU MAKE: Write
to Schrader for free
service pads, envelopes
and other sales helps.

Schrader

REG. U.S. PAT. OFF.

TIRE VALVE PARTS and ACCESSORIES

A. SCHRADER'S SON Division of Scovill Manufacturing Company, Incorporated BROOKLYN, N. Y.



Retail sales for the first six months, as compiled by the Automobile Manufacturers Association, also show a marked increase over the same period last year. Sales to the end of June this year totaled 1,686,123—a gain of

about 43 per cent over the 1938 six-month period. June sales declined about 7 per cent from May.

Only four times in the past decade have June sales been higher than those of May, which is usually con-

sidered the peak month of the retail selling year. Passenger car sales, which are apt to be more changeable, have advanced in June over May five times in the decade, trucks only once before.

As MOTOR AGE went to press it appeared that the July output of cars and trucks by the factories would be about 180,000 units—nearly 20 per cent higher than July, 1938.

Packard says it will be the first of the manufacturers to introduce its 1940 models. The new cars are already under construction and deliveries are expected to begin during the first half of August. While no prices have been announced, M. M. Gilman, president of the company, stated that further price reductions might result from economies anticipated from the program of plant rearrangement and unification recently completed. This program, effected over a period of four years and representing an outlay of millions of dollars, also means substantially increased production capacity.

Hudson has advised the American Automobile Association that it will attempt to set new 15,000 mile economy records in two classes. One of the runs will attempt to better the record recently established by a Studebaker Champion at Indianapolis.

The runs will be made at the Bonneville Saltbeds in conjunction with the one-mile world record attempt of John Cobb. Cobb's run is expected to be made on or shortly after Aug. 15.

Nash announces the perfection of a new type of welding gun that is said to permit a far greater degree of flexibility and efficiency than has heretofore been possible. The new gun, it is reported, makes it possible to obtain as high as 275 spots per minute—as compared with 90 to 125 spots obtained with conventional gun welding equipment.

B. F. Goodrich Co. celebrated its 70th birthday last month with ceremonies at Akron and at the New York World's Fair. A portion of the ceremonies at the Fair included five hostesses clothed in motoring outfits dating from 1890 who imprinted the treads of five "epochal" tires in a concrete slab in front of the Goodrich exhibit. These treads represented the first solid "horseless carriage" tire, the first pneumatic automobile tire, the first cord tire, the first balloon tire and the latest Goodrich Life Saver tire.

The Automobile Manufacturers Association tells us that enough film for a "super-colossal epic" is "shot" in laboratories at the automobile plants each year, yet not a foot of it is ever exposed to a movie queen's smile. Instead, the camera's eye is responsible to a great extent for the smooth and dependable performance of the modern car engine. Only the camera can catch and record the rate of pressure change within the cylinder while the engine is operating. Differences in metallic structure, as well as hidden flaws are disclosed by micro-photographs. Camera studies are especially important in comparing the surface (Continued on page 37)

When live wires connect, volume goes up



The DOSTAM METHOD is a new type of business management . . .

through which both direct labor and the distributing factors . . . jobbers and dealers . . . materially benefit. Under the Dostam Method, production is completely controlled, from the purchase of raw materials to finished products . . . expensive management overhead is eliminated . . . sales expense is rigidly controlled. The economies of the Dostam Method not only permit a higher wage to direct labor . . . but the production of the highest quality products at prices which average 20 per cent under the price of other well-known products.

The growth of the Crescent Company within comparatively few years to a position as the largest independent manufacturer of automotive

wiring is a direct reflection of the success of the Dostam Method for producing quality products at decreased costs.

For highest quality . . . for completeness of line . . . for profit possibilities, the Wiry Joe Line cannot be equalled.

This advertisement is appearing in all leading trade publications this month.

Wiry Joe AUTOMOTIVE WIRING

is produced under the

DOSTAM METHOD

THE CRESCENT COMPANY *Auto Cable*

Pawtucket, Rhode Island, U. S. A.
Montreal, Canada

Factory Smoke

(Continued from page 32)

and grain of the same piece of metal before and after it has been treated and machined, as they indicate whether or not the material has been properly hardened, cut or finished.

* * *

Just as a matter of passing interest you might care to know that in building 200,000 cars Pontiac Motors uses the agricultural products from 100,000 acres—including 100,000 bushels of corn for butyl alcohol and starch; 13,800,000 lbs. of cotton for tires, brake lining, etc.; 500,000 gallons of molasses for solvents, anti-freeze and shock absorber fluids; 640,000 lbs. of wool for upholstery, floor coverings, etc., 70,000 lbs. of goat hair for mohair upholstery; 400,000 lbs. of turpentine for solvents, paints and adhesives; 13,800,000 lbs. of rubber for several hundred parts, and 24,400,000 ft. of lumber for packing, etc.

Diesel Blower

(Continued from page 19)

into rear end of rotor shafts and two anchor bolts (G) into each timing gear. Screw four anchor bolts A through end plate and into blower body so that face plate H is parallel with face of blower. Then turn two puller nuts (D) uniformly counter clockwise keeping face plate parallel with face of blower.

If it is desired to remove the gears without dis-assembling the blower simply leave fillister head screws in place in each end plate and do not use anchor bolts (A).

The rear end plate can be pulled by fitting puller plates (E) to puller studs (C) with fillister heads removed and anchor bolts (A) engaged and turn puller studs clockwise. The puller can also be used to press rotor shafts from front end plate.

When the blower is dis-assembled check to oil seals and bearings. The puller has a fixture for pushing new oil seals into end plates. Check rotor lobes for burrs and make sure that there is no indication that rotors are touching end plates. Bearings can be pushed into place with the fingers when entered straight. Bearings numbers must always be towards outside of end plate. Stamped bearing retainers should be installed so that flange is towards bearing in the single row bearings and away from the bearing in the double row installations.

In re-assembling the puller will work as a pusher and will reverse each process of dis-assembly. There are, however, a number of things to remember. Among them is the fact that the gear with the right hand helix is the drive gear and should be installed on the shaft of the rotor which has a right hand spiral. The gears must be pressed onto the shafts together same as they were removed and they must be "timed." This is done by assembling rotors so that the missing spline on the drive end of each is straight up and the installing gears so that missing spline on gears mate with the rotor shafts.

When the unit is assembled the gears must be checked for lash, .005 in. lash being the maximum permitted. The rotor to end plate and

the rotor to rotor clearance must be checked to the specifications given in the illustration. The checking can be done with a piece of shim stock.

If the check on the rotor to rotor clearance shows the clearance on one side of the lobes to be .002 and .014 in. on the other side, one rotor must be moved one-half the difference between these two clearances. This would mean that one rotor would have to be moved .006 in. in relation to the other.

Since the angle of the gear teeth is about 45 deg. a .001 in. shim placed behind one gear will change the relative position of the rotor about .001 in. The movement will be op-

posite the direction of the gear helix and the rotor spiral. Shims are furnished in .002, .005, .010 in. for this adjustment.

The air box pressure can be measured by mounting a pressure gage through one of the air box inspection plates. This would be a measure of the output of the blower but there seems to be no reason to check the pressure unless there is some indication of trouble from this source. A large increase in air box pressure does not indicate that anything is wrong with the blower. It is evidence that the exhaust pipe has been bent or that the muffler has become plugged.

TUMBLER

NOW IN
25¢
PACKAGES

TUMBLER

BRILLIANT POLISH

This nationally advertised, nationally known polish is now available in a generous 25c size . . . enough for two to three car polishes. Tumbler Brilliant Polish restores new car lustre and retards finish oxidation. It's the easiest to use and fastest polish for the man who shines his own bus.

TUMBLER

SPEEDY CAR WASH

The most amazing car washing material ever developed. Not a soap . . . contains no alkalis or abrasives. Just add Tumbler Speedy Car Wash to the water. It cuts washing time to a fraction, and the car dries without spots or stains without even wiping. Just wash the car . . . rinse it off . . . let it dry. Sells like hot cakes in this 25c size. Enough in each can for 3 washings.

ASK YOUR JOBBER'S SALESMAN . . .

OR WRITE, WIRE OR PHONE

J. A. TUMBLER LABORATORIES

BALTIMORE, MARYLAND

Mix-Up in Deciding

Stock Car Race Winner

Mark Light, of Lebanon, Pa., professional auto race driver and race promoter, likely will go into the official record books of the American Automobile Association's Contest Board as winner of the 200-mile All-American Stock Car Race run July 4 on the Langhorne (Pa.) Speedway.

Ted Allen, secretary of the governing body of the sport, said an early survey of the records revealed that Contest Board officials were correct in revising the finishing positions of the race after Bill Shoop had been announced as winner at the track.

Allen said that as far as he could check so far, the official tabulations established Light as the rightful winner.

However, a protest from Shoop and other drivers is still pending and will be answered at an early date, Allen said.

Ford, which had won most of the major road and stock car races in recent years, could do no better than second in the grind on the Pennsylvania track. Walt Keiper, of Trenton, N. J., another professional driver, piloted a 1938 Ford across the finish line on the heels of Light. It was not again until ninth position that Ford came in.

Buick did well by itself in copping

three of the first five positions. Light drove a Buick "60" to victory.

Light's time for the 200 miles was three hours, three minutes and thirty-nine seconds.

Following is the tabulation of the results which the AAA Contest Board will likely substantiate in the final checkup:

Pos.	Car	Driver
1—	Buick '60'	Mark Light
2—	1938 Ford	Walt Keiper
3—	'38 Willys-Overland	Bert Ross
4—	'38 Buick '60'	Henry Banks
5—	'39 Buick '40'	Bill Shoop
6—	'38 Oldsmobile 8	Ted Nyquist
7—	'39 Plymouth	Mike Felber
8—	'38 Lincoln Zephyr	J. F. Frerichs
9—	'38 Ford	Ken Hickey
10—	'39 Packard '120'	*Frank Smith
11—	'37 Ford	*Bob Cooney
12—	'37 Ford	*Larry Beckett
13—	'39 Dodge	*John Rogers
14—	'38 Ford	*Buster Warke
15—	'39 Ford	*Roy Hall
16—	'39 Ford	*Bill McCarthy
17—	'38 Ford	*Jack Hicks
18—	'38 Ford	*Tom Toner
19—	'39 Studebaker Champ.	*Metz Simins
20—	'39 Ford Mercury	*Johnny Rice

* Flagged: Smith on 198th lap; Cooney, 198th lap; Beckett, 197th lap; Rogers, 197th lap; Warke, 196th lap; Hall, 195th lap; McCarthy, 195th lap; Hicks, 194th lap; Toner, 192nd lap; Simins, 190th lap; Rice, 188th lap. Langhorne is a one-mile speedway.

September Stock Car Race at Roosevelt Track

A 250-mile stock car race on Roosevelt Raceway, scene of the Vanderbilt Cup events of 1936 and 1937, has been scheduled for Sept. 9, it was announced at headquarters of the Contest Board of the American Automobile Association. The event originally was carded for August by Ralph DePalma, former national auto race champion and Indianapolis race winner, who is managing the race promotion.

Carburetor Exchange

The Parts Mfg. Corp., 199 So. Portland Ave., Brooklyn, N. Y., is now supplying completely reconditioned carburetors on an exchange basis for Ford, Chevrolet and Plymouth cars. Satisfactory performance is guaranteed through the PARCO factory system of rebuilding. Carburetors are Stromberg, Zenith, Carter, etc., car equipment units. For complete information and prices, write the Parts Mfg. Corp.



"Bah . . . you and your free service ideas!"

SPARKLING WHITE SADDLE makes new H-W Hydraulic Jack EASY TO SPOT



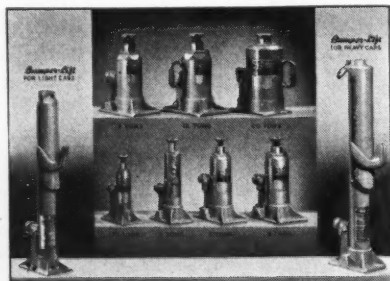
HEIN-WERNER O'BOY HYDRAULIC SERVICE JACK at only \$17⁴⁵ is a real "buy"

O'BOY—it's a honey! This sturdy, 2,500 lb. capacity H-W Hydraulic Service Jack, like all other models in this line, is *built right* and *priced right* . . . It has leak-proof hydraulic power unit made of alloy steel . . . Operates with amazing ease . . . SAFE . . . Has positive release valve . . . Big 4" wheels—rolls easily on rough floors . . . Raises to 17½"—high enough to change tires on any passenger car . . . Easy to carry to job . . . Finished in sparkling red with glistening white saddle . . . Weight 60 lbs. . . Model "O" is priced at only \$17.45 net to dealer (West Coast \$18.45)

Ask your jobber for details—or write us

HEIN-WERNER MOTOR PARTS CORP.
Waukesha, Wisconsin

FEW MODELS ENGINEERED TO DO THE WORK OF MANY
HEIN-WERNER
hydraulic JACKS



COMPLETE LINE of Hein-Werner Hydraulic Jacks includes Bumper-Lift for passenger cars, and 1½ ton, 2, 3, 5, 7, 12 and 20 ton capacity Hand Jacks for cars and trucks . . . Also 1½, 2, 3 and 4 ton Service Jacks.

WAY OUT IN FRONT



WITHOUT EVEN A CLOSE SECOND



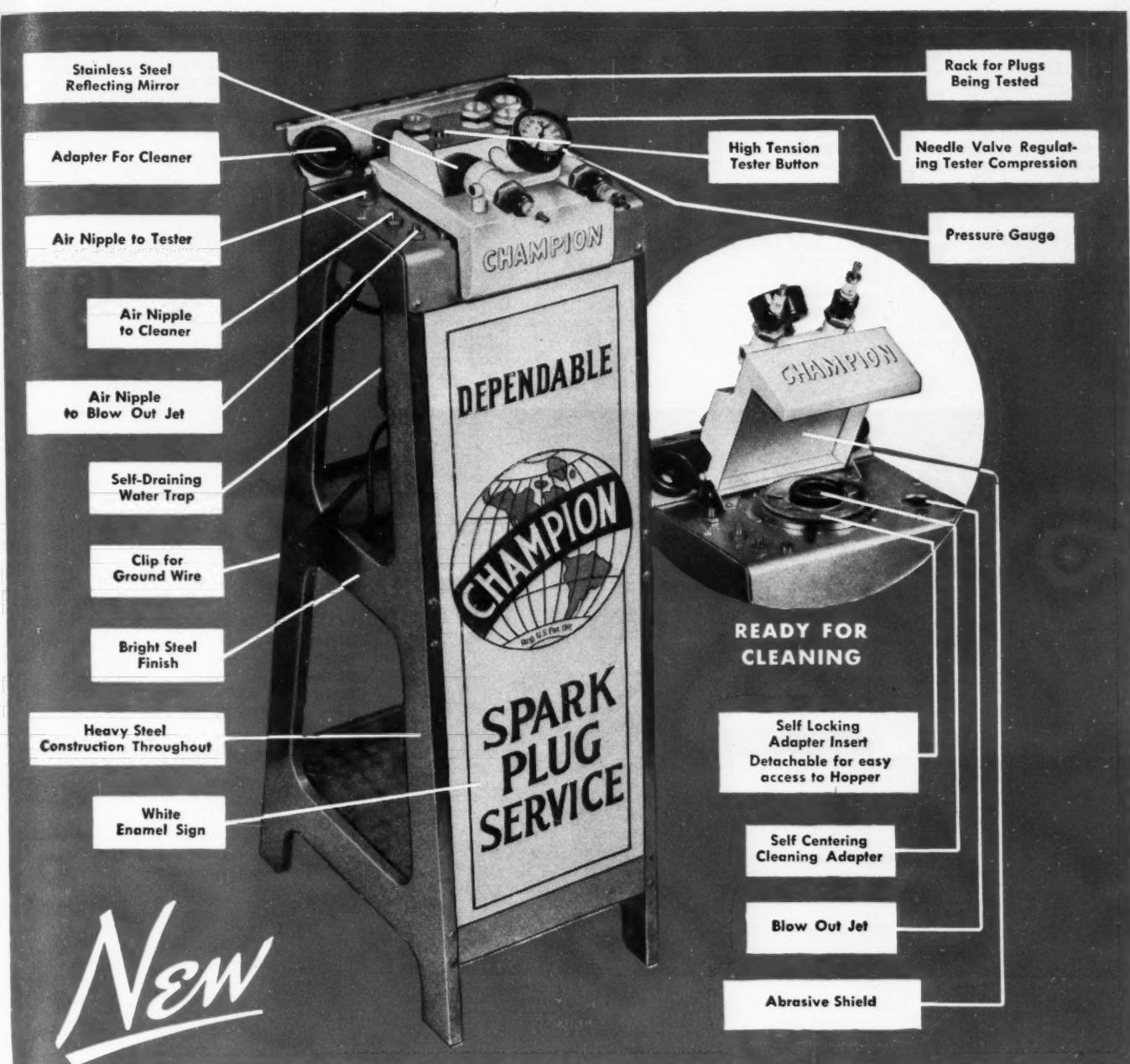
King Quality originated Engineered sets to take the guess-work and grief out of the piston ring business. And King Quality Altinized Engineered Set Piston Rings are doing just that. That's why they're way out in front without even a close second. Order by stock number and get the rings that do the job best because they are *specifically engineered* for the particular model on which you are working.

KING QUALITY PRODUCTS CO.
ST. LOUIS, MO.

PARTS NUMBERS AND PRICES

La Salle Series 39-50—V-8—1939

FRONT SUSPENSION			ENGINE PARTS—continued			ELECTRICAL SYSTEM		
Part No.	No. Used	Price	Part No.	No. Used	Price	Part No.	No. Used	Price
3504669—Knuckle, L.	1	\$7.50	1433615—Comp. ring (3/32) ..	8	\$0.40	1110604—Distributor assem. .	1	\$9.50
1429224—Knuckle support, L. .	1	5.50	1433651—Comp. ring (1/8) ...	8	.40	1868660—Distributor cap ...	1	2.50
231843—King pin	2	.85	1433650—Oil ring	16	.65	818222—Distributor weight ...	2	.20
231905—King pin bush.	4	.15	1415295—Piston pin	8	.65	818494—Distributor spring ...	2	.05
230679—Pin thrust brg.	2	.50	1420335—Piston pin bushing. .	8	.20	1865919—Distributor cam ...	1	1.00
230857—King pin lock pin.	2	.15	1414814—Piston pin retainer .	16	.03	1854836—Distributor shaft ...	1	1.50
5307601—Shock absorber, L. .	1	11.25	3502633—Con. rod, less brg. ...	8	7.50	1871869—Contact set	1	.75
231760—Upper arm pin.	2	.50	1419712—Con. rod brg., up. .	8	.60	1836893—Rotor	1	.30
231761—Pin bush., threaded. .	2	.35	1419713—Con. rod brg., low. .	8	.60	1869704—Condenser	1	.40
1298827—Pin bushing, plain. .	2	.30	1420220—Inlet valve	8	1.00	1115128—Ignition coil	1	3.50
1433325—Low. support arm & in. shaft assem., L. .	1	7.25	1420212—Exhaust valve	8	1.75	435K—Ignition switch	1	1.50
1433359—Lower arm pin.	2	.75	1410898—Valve spring	16	.35	1994506—Lighting switch ...	1	1.25
1433394—Low. arm pin bush. .	2	.60	1411030—Spring seat, up.	16	.20	476S—Stop light switch.	1	.30
231730—Low. arm pin seal.	4	.05	1411031—Spring seat, low.	16	.20	1996003—Starter switch	1	.75
1428427—Main coil spring.	2	5.00	403219—Valve key	32	.05	1542—Starter solenoid	1	7.00
264939—Tie rod	2	1.50	1415140—Valve guide	16	.60	1997002—Dimmer switch ...	1	.50
264924—Tie rod adjuster.	2	.25	1415655—Valve lifter body.	16	1.00	857873—Ammeter	1	1.80
265175—End assembly, L.	1	2.85	1415656—Lifter plunger	16	1.10	1101056—Generator assem. ...	1	20.00
1433292—Knuckle arm, L.	1	2.95	1096712—Valve lifter guide.	4	3.50	1857963—Gen. brush set.	1	.40
1433331—Front wheel, prime. .	2	11.50	1410603—Timing chain	1	6.20	1866789—Gen. armature exch. .	1	4.50
1421125—Wheel hub cap.	2	1.95	1425712—Crankshaft sprocket .	1	3.50	812823—Comm. end bush.	1	.15
1433328—Front hub & drum ...	2	10.00	1428063—Camshaft sprocket .	1	3.25	3203—Drive end bearing.	1	1.15
909042—Wheel bearing, in.	2	3.20	MAIN BEARINGS			1869430—Gen. field coil set. .	1	1.80
909001—Wheel bearing, out. ...	2	1.95	1096875—Front	1	2.25	5860—Voltage regulator	1	4.00
3504679—Grease retainer	2	.45	1096873—Center	1	3.25	1107912—Starter assembly ...	1	27.50
STEERING			1096877—Rear	1	3.25	1857960—Starter brush set. .	1	.30
265226—Drag link	1	2.25	ENGINE OILING			820158—Starter arm. exch. ...	1	5.00
264946—Ball seat	8	.15	1412171—Oil pump body.	1	4.90	810620—Drive end bushing. .	1	.10
335976—Seat spring, R.	2	.20	1413197—Pump shaft	1	.85	826282—Field coil, up.	1	1.60
265091—Pitman arm	1	1.75	1411460—Pump drive gear.	1	2.35	1860408—Drive housing	1	2.25
264953—Idler arm	1	1.00	1096485—Pump gear set.	1	3.60	1873789—Starter clutch	1	3.50
263278—Cross shaft	1	6.50	1412987—Relief valve	1	.40	917649—Headlamp, L., prime .	1	13.00
263305—Cross shaft bush.	1	.30	1412414—Relief valve spring .	1	.05	924244—Headlamp reflector. .	2	1.25
265118—Gear housing	1	7.50	CLUTCH			923453—Headlamp door, L.	1	1.00
11BC—Tube & worm assem.	2	8.75	1433146—Housing	1	16.50	923427—Headlamp lens, L.	1	1.50
14CE—Worm brg. cone.	2	1.05	1421681—Release bearing	1	3.75	916863—Rear lamp, L., prime .	1	5.00
265185—Jacket tube	1	3.50	*1426136—Disk & facing.	1	11.75	916866—License lamp	1	3.75
262159—Jacket tube bush., up. .	1	.70	*1096900—Disk facing set.	1	4.00	923197—Rear lamp lens.	2	.60
1433083—Steering wheel	1	9.00	*2000034—Press. plate only. .	1	3.40	5271231—Bat. to switch cable .	1	2.35
1429599—Steering wheel del. .	1	12.50	1418407—Pressure spring	9	.20	5271240—Bat. ground cable. .	1	.50
COOLING			1425371—Spline shaft	1	13.75	FRAME AND BODY		
3112463—Rad. core assem.	1	52.00	7109—Pilot bearing	1	2.00	(4 door sedans in prime)		
3504975—Rad. shell panel, L. .	1	8.50	47508—Spline shaft brg., R. .	1	6.05	3504963—Front fender, L.	1	28.50
3504930—Rad. valance, L.	1	.95	TRANSMISSION			3505019—With well, L.	1	42.50
3504811—Radiator grille, L.	1	14.50	1429793—Case	1	18.50	3505180—Rear fender, L.	1	12.50
3505056—Radiator grille, C.	1	18.50	1423562—Countershaft	1	2.00	3504880—Hood top panel.	1	35.00
3504913—Radiator shutter ...	1	8.50	1298445—CS. bearing	56	.01	3504971—Hood side panel, L. .	1	4.85
1510773—Temperature gage ...	1	1.80	1096843—CS. gear cluster.	1	17.50	4081958—Cowl vent. seal.	1	P.O.A.
1433442—Thermostat	1	4.85	1428868—Mainshaft	1	17.00	4089631—Windshield glass ...	2	8.95
1096946—Water pump body.	1	4.90	75053—Mnshft. pilot brg.	14	.02	4090319—Windshield seal ...	2	3.50
1433507—Water pump belt.	1	1.95	47508-7—Mnshft. brg., R.	1	6.05	1092405—Door assem., L. F. ...	1	98.50
1096696—Shaft and impeller.	1	2.95	1419574—Low sliding gear.	1	9.50	1092443—Door assem., L. R. ...	1	93.50
88016—Shaft bearing	1	2.30	3503372—Second speed gear. .	1	8.50	1092467—Door, stripped, L.F. .	1	33.50
1403956—Pump packing	4	.15	3502510—Reverse idler gear.	1	8.25	1092475—Door, stripped, L.R. .	1	33.50
1403283—Packing bushing	1	.45	3504090—Synch. drum assem. .	1	10.50	4091148—Door lock striker.	4	.80
1411981—Packing ring, inner ...	2	.30	1419643—Cover	1	2.10	4073913—Dovetail wdg. plate .	4	P.O.A.
1429050—Fan belt	1	1.85	1428646—Gear shift lever.	1	3.50	4075334—Dovetail shoe	8	P.O.A.
1426561—Fan blades	1	2.90	1429743—Shift lever housing. .	1	3.15	4092263—Door weatherstrip. .	4	1.70
885146—Fan bearing	1	3.60	3504707—Shifter shaft & lever, low	1	5.50	4090615—Door glass, front.	2	5.50
1097152—Fan shaft & brg.	1	3.90	1429711—Lower shift lever, low ...	1	1.50	4090519—Door vent. glass.	2	3.25
FUEL & EXHAUST SYSTEMS			3504729—Inner shift lever & shaft, low	1	2.00	4091228—Glass regltr., L. F. ...	1	2.50
1433566—Carburetor assem.	1	28.00	1097038—Extension housing. .	1	8.50	4090550—Vent. regltr., L.	1	1.55
1515361—Gas gage (dash)	1	1.80	3206—Extension brg.	1	4.00	4090545—Vent. weatherstrip, L.	1	1.15
1515485—Gas gage (tank)	1	1.80	UNIVERSALS			4091100—Remote cntrl., L.F. ...	1	.55
1434P25—Auto. choke coil.	1	2.00	3502144—Trans. flange	1	3.75	4091098—Door lock, L. F.	1	1.75
1411535—Flexible gas line.	1	.85	1424820—Cross & brg. assem. .	2	4.95	4091146—Door handle	4	2.75
15P3R66—Fuel & vac. pump.	1	12.00	1416516—Needle bearing	144	.02	4091129—Door handle, inside .	4	1.10
1410847—Inlet manifold	1	17.50	059045—Bearing packing	8	.05	4090633—Door glass run, L.F. .	1	1.25
1411143—Cross manifold	1	5.50	1421197—Spline yoke	1	4.85	4091380—Back window glass. .	1	8.75
1422747—Exh. manifold, L.	1	11.75	3503748—Pinion shaft flange .	1	3.75	4090921—Back glass seal.	1	2.50
1433812—Muffler	1	8.50	1435193—Propeller shaft	1	7.50	4091456—Trunk lid	1	20.00
1429930—Tail pipe	1	4.00	REAR AXLE			4091472—Trunk lid seal.	1	2.25
1429820—Exhaust pipe	1	3.85	1428908—Housing	1	28.50	4091446—Trunk lid handle.	1	4.10
ENGINE GASKETS			3503747—Diff. carrier assem. with ring & pinion ...	1	85.00	4091467—Trunk lid lock.	1	1.85
1411095—Carb. to manifold.	2	.15	1418741—Diff. carrier gasket .	1	.10	1428695—Frame	1	90.00
1411094—Fuel pump	1	.03	1413635—Pinion oil seal.	1	1.25	1434365—Front crossmember .	1	13.50
1419216—Exh. pipe flange.	1	.10	3880—Pinion cone, F.	1	4.76	1428384—Rear crossmember. .	1	2.50
1419158—Mani. to block.	2	.40	3820—Pinion cup, F.	1	2.55	1433296—Running board, L.	1	10.50
1411133—Cross manifold	2	.10	3779—Pinion cone, R.	1	5.11	1433411—Run. brd. molding. .	2	2.25
1419114—Cylinder head	2	.85	3732—Pinion cup, R.	1	3.39	1433114—Run. brd. brkt., F. .	2	.95
1097023—Oil pan set.	1	.50	25584T—Diff. cone	2	3.95	1428751—F. bumper face bar .	1	10.50
1435209—Main brg. packing.	2	.10	25526—Diff. cup	2	2.40	1428840—Back bar, inner.	2	1.35
1411135—Main brg. cork.	2	.10	1418889—Grease retainer, in. .	2	.90	1428841—Back bar, outer.	2	1.35
1413272—Timing case	1	.08	1423789—Axle shaft	2	9.50	1428838—R. bumper face bar .	1	10.60
1420990—Timing case oil seal .	1	.75	88128—Axle shaft bearing.	2	7.00	1428849—Back bar, inner.	2	1.20
1411420—Valve cover	2	.20	1433330—Rear hub & drum.	2	10.25	1428850—Back bar, outer.	2	1.00
1096766—Valve regrdng set.	1	3.56	5307627—Shock absorber, L.	1	8.00	BRAKES		
1411274—Water outlet	2	.03	5313023—Shock absorber link .	2	.95	1434137—Hand brake bracket ...	1	.65
1411203—Water pump	1	.05	REAR SPRING			1429215—Hand brake cable.	1	2.50
1419388—Thermostat	1	.10	1428637—Assembly, sedans	2	13.75	1310387—Hand brake lock.	1	.20
ENGINE PARTS			1433914—Front bolt	2	.75	1310379—Hand brake lever.	1	1.25
1097030—Block with pistons, pins and rings.	1	210.00	1427894—Rubber bushing	12	.20	5450323—Master cyl. assem.	1	5.50
1434113—Cylinder head, L.	1	14.00	1428202—Shackle link, inner .	2	1.20	5450070—Master cyl. cup.	1	.20
3504674—Oil pan	1	5.25	1428203—Shackle link, outer .	2	.45	231432—Secondary cup	1	.20
3504655—Crankshaft	1	65.00	1433410—Spring cilo	4	.95	5300850—Master cyl. boot.	1	.35
1429089—Camshaft	1	22.50	1422575—Center bolt	2	.20	5450213—Check valve	1	.20
3504558—Flywheel	1	13.50				5450150—Check valve seat.	1	.15
1097024—Piston, pin & rings ...	8	7.50				5301079—Wheel cyl., L. F.	1	2.75



CHAMPION Super Sales Service Unit

The Complete Spark Plug Sales—Service Department

THE NEW CHAMPION Super Sales Service Unit fills a long felt need for a modern, self-contained and complete spark plug sales and service department, in one portable unit.

Not to be confused with bench type units, the Champion Super Sales Service Unit stands 36 inches high, is sturdily and handsomely built, streamlined to harmonize with the most modern shop equipment.

Complete with all necessary adapters for

testing plugs, as well as self-centering adapters for cleaning. New self-draining water-trap and new accessibility to coil, transformer, and nozzle housings. Rubber hose for permanent air connection. All you need is 110 Volt alternating current and compressed air.

For greater spark plug sales and service profits, order your new Champion Super Sales Service Unit NOW. Price Only \$18.00 complete!

SELL THE SPARK PLUG CHAMPIONS USE

AAA Race Schedule

Automobile races scheduled for August and September by the Contest Board of the American Automobile Association are:

Aug. 13 Williams Grove (Pa.) Speedway
 Aug. 13 Clarksburg, (W. Va.) Hankinson Speedway
 Aug. 19 Afton (N. Y.) Fairgrounds
 Aug. 19 Middletown (N. Y.) Fairgrounds
 Aug. 19 Springfield (Ill.) Fairgrounds
 Aug. 20 Lebanon, Pa.
 Aug. 20 Milwaukee (Wisc.) Fairgrounds
 Aug. 24 Milwaukee (Wisc.) Fairgrounds
 Aug. 26 Hamburg (N. Y.) Fairgrounds
 Aug. 26 Bedford (Pa.) Fairgrounds
 Aug. 26 Altamont (N. Y.) Fairgrounds
 Aug. 27 Williams Grove (Pa.) Speedway

Aug. 27 MILWAUKEE (WISC.) FAIR-
 GROUNDS
 Sept. 2 SYRACUSE (N. Y.) FAIR-
 GROUNDS
 Sept. 2 Essex Junction (Vt.) Fair-
 grounds
 Sept. 2 Flemington (N. J.) Fairgrounds
 Sept. 3 Williams Grove (Pa.) Speedway
 Sept. 4 Flemington (N. J.) Fairgrounds
 Sept. 4 Altoona (Pa.) Speedway
 Sept. 4 Pikes Peak, Colorado
 Sept. 4 Richmond (Va.) Fairgrounds
 Sept. 8 Rutland (Vt.) Fairgrounds
 Sept. 16 Hughesville (Pa.) Fairgrounds
 Sept. 17 Reading (Pa.) Fairgrounds
 Sept. 23 Allentown (Pa.) Fairgrounds
 Sept. 24 Williams Grove (Pa.) Speedway
 Sept. 30 Richmond (Va.) Fairgrounds
 Sept. 30 Shelby (N. C.) Fairgrounds
 Sept. 30 Bloomsburg (Pa.) Fairgrounds



New! Model H-502—Finest Heater ever built under HaDees name

New! Model H-202—1940 version of popular round type HaDees

New! HaDees Chief—Lowest price ever offered under HaDees name

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**...THE GREATEST
 VALUES HaDees HAS
 OFFERED IN 11 YEARS
 OF HOT WATER HEATER
 SPECIALIZATION AND
 DEVELOPMENT**

★
HaDees HOT WATER
CAR HEATERS

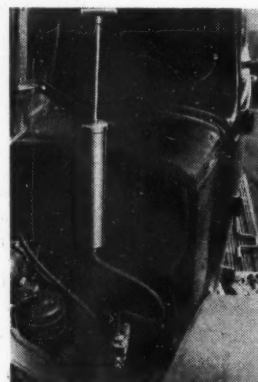
For the 1939-40 car heater selling season HaDees offers new beauty.... new heat capacity.... new convenience.... yes, and new profit possibilities in seven striking new models. You'll find selling features that could only come from more than a decade of heater specialization and development... plus a brilliant array of selling helps.

See the smartly styled new models in sizes and prices for every purse and purpose. Get in line for easier sales and more of them... top your biggest heater year... line up with HaDees NOW! Details of the profit proposition are ready!

LIBERTY FOUNDRIES CO.
 (Division of Burd Piston Ring Co.)
 ROCKFORD, ILLINOIS

One-Man Brake Bleeder

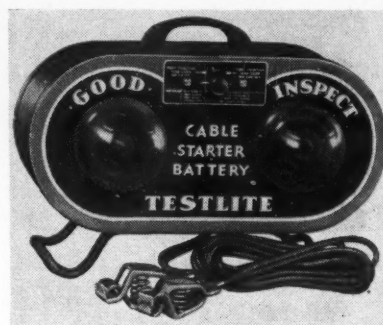
Thermoid Co., Whitehead Rd., Trenton, N. J. announces a new Thermoid Brake Pressure Bleeder. One man can operate it. Holds only enough fluid to bleed one car—does not waste fluid. Operates with a coiled spring



pressure of 20 lbs., and requires no compressed air. Supplied with operating instructions and all connections necessary to fit it to every type of car and truck having hydraulic brakes. The Pressure Bleeder is furnished in eight different deals, each containing only the most popular brake lining sets. A generous assortment of advertising material also goes with each deal.

Tests Starting Circuit

The new Testlite announced by Allen Electric & Equipment Co., Kalamazoo, Mich., is designed to locate trouble in the battery, starter, starting switch or cables before road



failure occurs. Any defect which causes a voltage drop below a set voltage between the starter terminal and ground while the starter is turning the engine, will cause the red light of the Testlite to glow—if the circuit is O.K. the green light glows. Easy to use, and a convincing test that owners can understand.

Cleans Carburetors and Fuel Pumps

A liquid solvent to be used cold, and designed especially for cleaning carburetors, fuel pumps and distributors, has been announced by the Carleton Products Co., 308 North Sixth St., St. Louis, Mo. Known as Ki-Sol No. 3, this new product is said to be non-injurious to metal plating, will not flash or explode, and cleans quickly. For further information and prices, write the manufacturer.

BASIC GROUP COMBINATIONS

make it easy
for you to modernize your shop with

LINCOLN

LUBRICATING EQUIPMENT

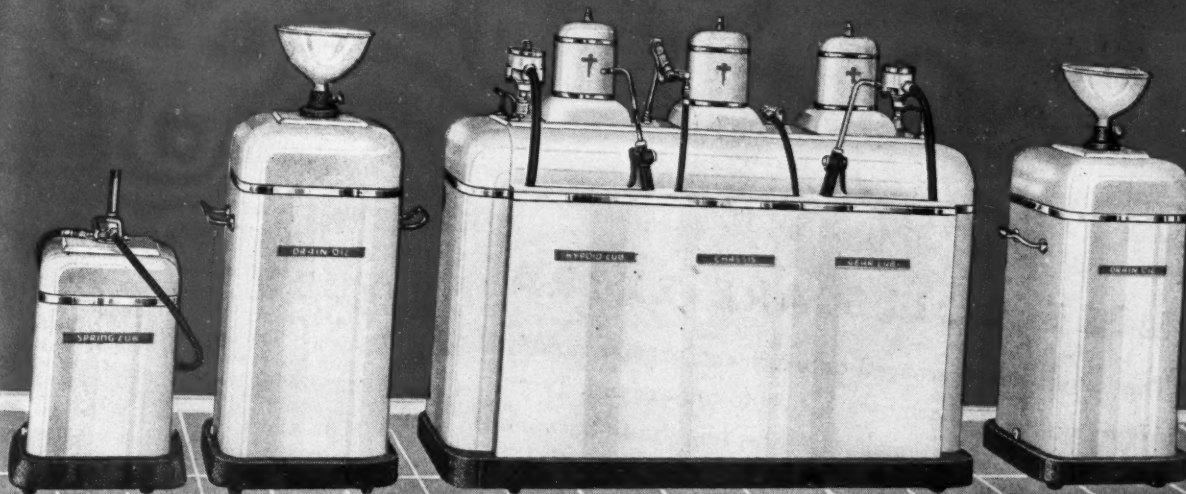
When you modernize your lubrication department you are confronted with two problems—first to make sure you choose the best equipment on the market, and second that you select the individual units which will serve you most efficiently. Lincoln Equipment and Lincoln Basic Groups give you the answer to both problems.

The attractive group of business building equipment shown below is one of fifteen dif-

ferent basic combinations of Lincoln Lubricating Equipment.

Some groups are larger than the one shown, and some are smaller. Some are for portable use, others for stationary installation. But no matter what your requirements are—you will find that Lincoln makes the right combination for your need . . . Groups, as well as other equipment in the complete Lincoln line, are illustrated and described in Catalog No. 52.

Ask your Lincoln jobber for details, or write us for Catalog No. 52



LINCOLN ENGINEERING COMPANY

Pioneer Builders of Engineered Lubricating Equipment

ST. LOUIS, MO., U. S. A.



Cobb Gets Set for Record Run

Although tragedy threatened to remove the American member from the world's "big three" super-speed drivers when Ab Jenkins was reported seriously burned July 26 at Bonneville Saltbed, John Cobb, the English ace, was ready to begin his assault on Captain George Eyston's mile record in mid-August.

Jenkins suffered severe burns on his right side when the terrific heat of his high-powered engine and of the salt flat set fire to his gasoline-soaked clothing. The fuel dripped onto his

racing overalls from a leaking hand pump.

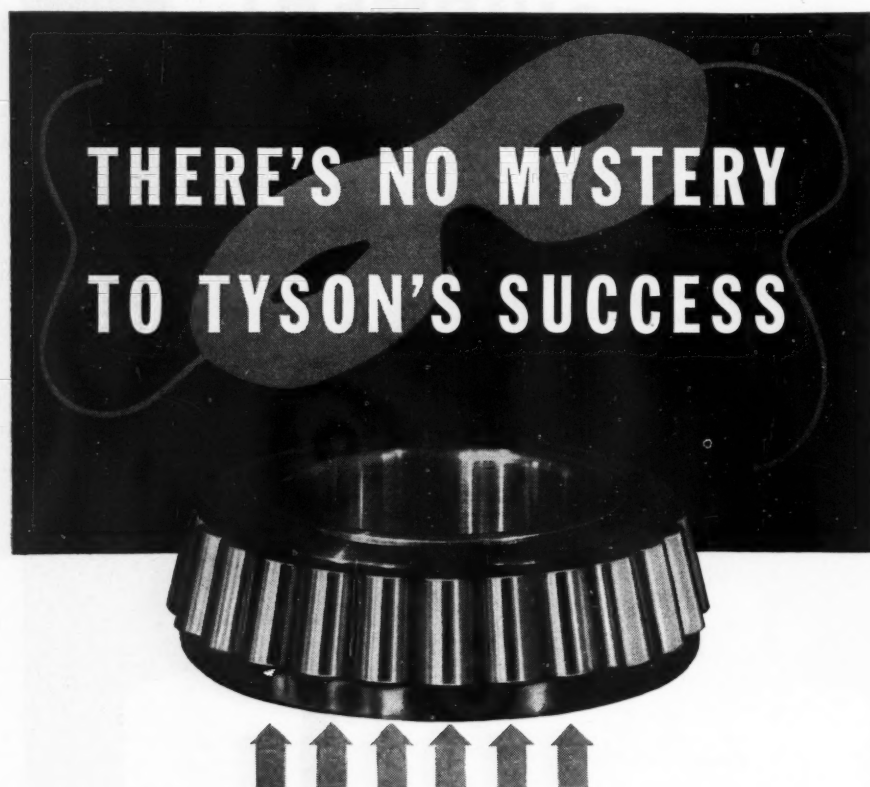
Odds in the racing circles were that Jenkins would not renew his assault on the longer distance records this year because of damage to his car and his physical condition. Jenkins was not admitted to a hospital, having been given emergency treatment.

Cobb, who was "king for a day" in the duel between himself and George Eyston for the mile record last year, was scheduled to arrive at Bonneville on August 7. He was expected to begin the speed assault on August 15, or a week later. However, it was predicted that he would not get into the peak speed gait until late August.

Cobb's revamped Ralston Special was shipped from England on July 21. The crew of mechanics and Cobb sailed on August 2 on the Queen Mary.

In Cobb's party, in addition to his mechanics, were Beris Wood, a London friend; John Dougdale, of the English motor publication, *Autocar*, and G. H. K. Taylor, of Thompson and Taylor Company, builders of the Ralston Special.

Eyston, who holds the existing mile record of 357.5 miles per hour, plans a new assault on the mark in 1940 with a revamped car. His "Thunderbolt" is on display in the British Pavilion at the New York World's Fair.



THESE ROLLS ARE EXTRA

- The longer life, increased capacity and greater rigidity of Tyson Cageless Bearings are easy to understand. Tyson eliminates the conventional cage and fills the in-between spaces with additional load-carrying rolls. Tyson will give you a brand new idea of tapered roller bearing performance.

Cageless FOR HARD SERVICE Cage-type FOR REGULAR SERVICE

Tyson

TYSON ROLLER BEARING CORPORATION, MASSILLON, OHIO

Sure-Rite in New Home

Due to an expansion in their business and the need for larger quarters, Sure-Rite Products Corp., formerly of 6010 N. Camac St., Philadelphia, Pa., has moved its factory and office



to a new and modern building located at 2731-37 North Sixth St., Philadelphia, Pa.

Tri-Zol Products

As the result of a new process for degumming castor oil, the Penn-Castor Oil Concentrate-Lubricants, Inc., 45-39 Thirty-seventh St., Long Island City, N. Y., has developed three new products: Tri-Zol crankcase oil additive for the removal of gummy binders behind the rings and on valve stems, Tri-Zol upper cylinder lubricant for freeing up sticky valves, and Tri-Zol penetrant and solvent for loosening up rusted and corroded bolts and nuts.



"The boss sent me after some seat covers!"

A-B-C!

You'll make more money on anti-freeze if you handle the brand in greatest demand!

HERE'S a straight-from-the-shoulder tip on how to make more profits on anti-freeze. Sell the *leading* brand of \$1.00 anti-freeze . . . the brand that has won leadership in 5 short years . . . the brand whose leadership is *still* increasing! That brand is Du Pont "Zerone"!

HERE'S WHY Du Pont "Zerone" is the nation's fastest selling \$1.00 anti-freeze.

A PRODUCT THAT'S RIGHT. First of all, "Zerone" gives extraordinary anti-freeze protection. Scientific tests prove "Zerone" would keep water from freezing solid even at 215° below zero. "Zerone" is so effective, you need comparatively little for protection. "Zerone" and water pass off engine heat faster than water alone. This means improved engine performance. And "Zerone" in a clean cooling system prevents rust and corrosion. All this at \$1.00 a gallon, in a product made by Du Pont!

STRONG PROMOTION—color ads in leading magazines, big schedules in hundreds of strong newspapers and outdoor boards—keep the "Zerone" story before the motor-ing public, wins large numbers of additional users every year. "Zerone" advertising is *pre-tested* at a cost of thousands of dollars to find the one most effective anti-freeze appeal. Station banners, consumer folders, service charts, and other promotional material help you tie in with national advertising reaching 25,054,100 people.

A STABLE PRICE POLICY with a good margin of profit provides attractive *certain* profits for dealers. The makers of "Zerone" attribute much of their success to the steps they have taken to protect the dealer's profit.

"Zerone" is available in quart, gallon and 54 gallon containers. Call your "Zerone" jobber and get your order in now! Du Pont, "Zerone" Division, Wilmington, Del.

there's one thing you can do about it!

Remember last year?

A mild autumn saw dealers delaying purchase of anti-freeze . . . or laying in small stocks. Then a sudden and severe cold snap around Thanksgiving hit most of the country. Countless dealers ran out of "Zerone" . . . had to turn away customers by the score. Jobbers were flooded with orders . . . couldn't make deliveries to everybody at once. Were you one of the dealers who lost out then?



Early servicing—early stocking

That's the answer. Most of your anti-freeze business is done in the first 3 freezing days. Get ready for this rush of business. Lay in an ample supply of "Zerone" now. But sell early protection, too. You don't have to wait till it gets cold to sell "Zerone." We're backing you up with special early season advertising. Remember, you do your customers a favor when you sell them early protection!

Invasion

(Continued from page 31)

of prominence in British and French racing circles are privately somewhat dubious concerning the success of either method.

Proposals of this nature are scarcely appropriate for the American situation. Government subsidies need not be considered because of their controversial nature. Popular subscription of funds is impractical and uncertain. But our automotive industry is the most powerful in the world. It has resources to complete an American formula car of worthy caliber; it

employs engineering talent capable of designing such a car, and the men and machines needed to build it.

More difficult to visualize is the matter of incentive. For some years now the industry has been in a position to be independent of automobile racing, feeling little more could be gained by active participation, that, indeed, much might be lost. Times have changed again, and European automotive firms now engaged in Grand Prix racing are once more extending research and design data through racing experience. Eventually this influence is bound to have an effect on world markets, and the American industry may be drawn

back into racing for its practical advantage.

Meanwhile, the near future might bring more decisive action. In the event of an official European invasion at Indianapolis next year, our automotive industry as certain to face the possibility of conclusive foreign successes, clearly presaged by the friendly triumph of Shaw's Maserati this year. The industry may adopt the position that its world prestige will be unaffected by further foreign conquests at the stronghold of American speed.

Note. The present International Formula, on paper, was intended to place supercharged and unsupercharged engines of various sizes on equal terms through prorating of car weights. Practical results, however, at once showed the superiority of 3 liter supercharged designs over all others. The term "formula car," in this article, is thus used to denote the 3 liter supercharged design.



K-D TOOLS

are speed leaders

On your next Ring Job, save fingers, rings and money
WITH THIS K-D COMBINATION

K-D 870



The machine shop way to size Rings. Ring held against gage (cut), one end each side of cutter. Natural "drag" of cutting holds ring against gage and both ends are filed square and parallel at the same time. Good for square, 45° and step-lap rings. Cutter files are sharp-milled and hardened. No. 870 Filer with 1 No. 872 Cutter File **LIST \$4.55**
 No. 872 Cutter File only **LIST .75**

K-D 875



For quick, easy handling of Rings on or off. Ring gripped as in cut, jaws in ring opening. When handles are compressed, ring is expanded. Stretched rings and cut fingers can be eliminated!
LIST \$1.30

K-D 10



Make a place for this outfit in your tool chest! Four "mighty midgets"; Standard, Parrot, Flat and Point, each 4 1/4" long, well made and correctly tempered. Packed in spill-proof kit. Handy on dash, radio, ignition, etc. **LIST \$2.00**

K-D 20



Another "vest pocket giant." 4 Ratchet Wrenches, 9/16", 1/2", 7/16" and 3/8" openings, with reversible ratchets and double offset screwdriver bit, in handy leatherette roll. Close teeth for short stroke. 3/8" only 3" long, 9/16" only 4 1/2" **LIST \$2.75**

K-D "BRITE-STEEL" WASHERS



are quality washers. Bright cold rolled steel, cut flat and clean, holes always centered. SAE and USS, 1/2" — 1" incl. SAE also in Veri-thin (1/32" thick) and Bevel Edge. 1 lb., 5 lb. boxes or bulk. Special sizes and shapes on order — let us quote?

DRUM STUD PEENING DIES



Special tool steel, heat treated. 565RD for 7/16" studs, **LIST \$2.55**. 570RD for 1/2" studs, **LIST \$2.55**. 567RD for 9/16" studs, **LIST \$2.55**. 575RD for 3/4" studs, **LIST \$3.20**. Also Complete Sets for brake and wheel departments. Catalog and prices on request.

ASK YOUR JOBBER FOR DEALERS' NET PRICES

K-D MANUFACTURING CO.

Lancaster, Pa.

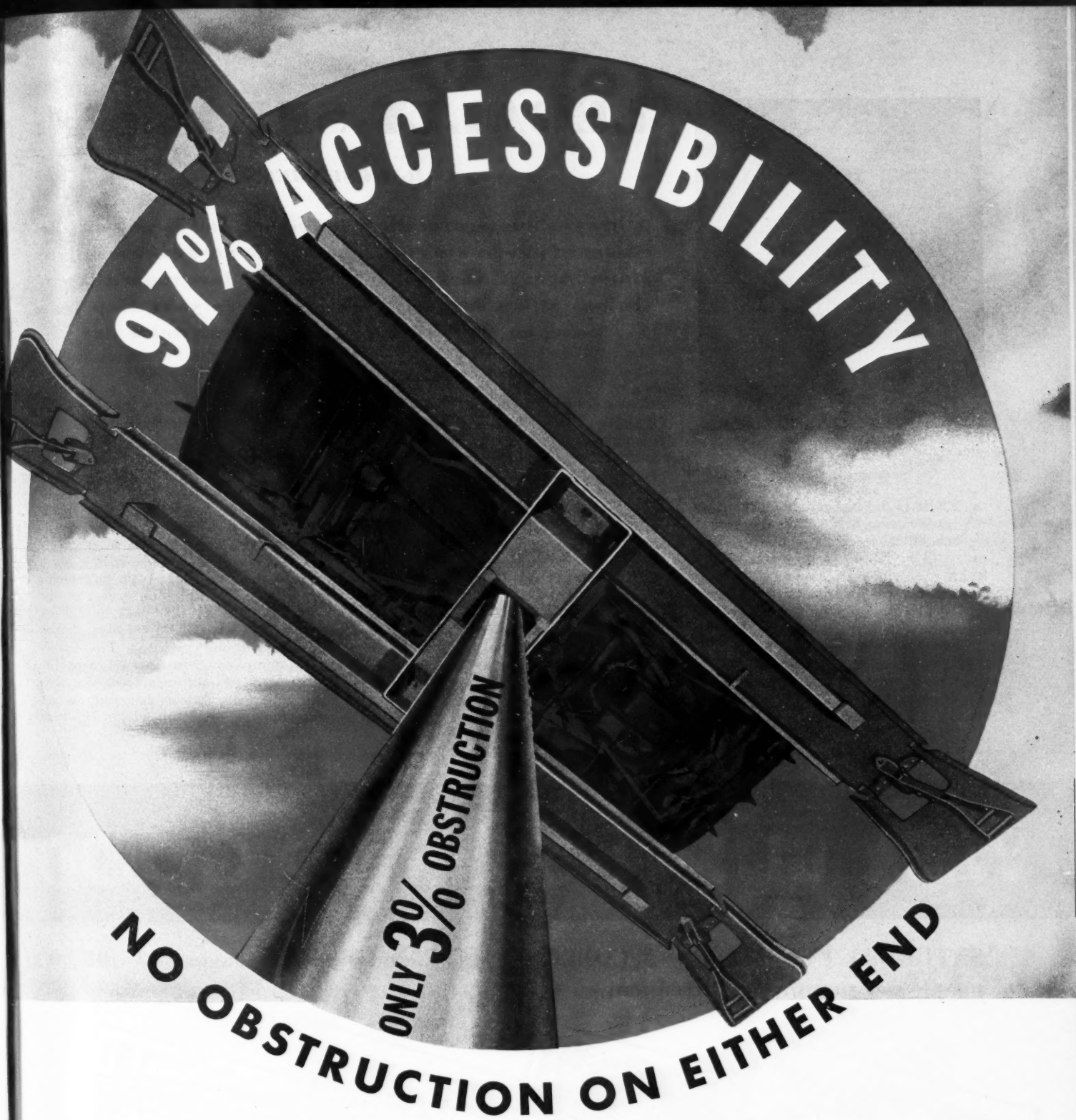
Champion Introduces Spark Plug Servicer

A new combination unit consisting of a spark plug cleaner and plug tester has been announced by the Champion Spark Plug Co., 904 Upton Ave., Toledo, Ohio. The tester is on top of the cabinet on a hinged platform. It can be folded back to provide access to the cleaner. A compression meter, and a rack for the plugs being tested, is a part of the unit.

Thus, from one piece of equipment, the spark plugs can be cleaned and tested at the job where the owner can watch the operations. Shelves are provided within the cabinet for a variety of stock. The new unit lists at \$18 to dealers.



"He says he's going to revolutionize the battery charging industry!"



♦ You can't move the grease fittings on an automobile and U. S. "Tailor Made" full hydraulic drive-on lift has complete accessibility exactly where those fittings are—front and rear ends of the car. ♦ That's where the operator does nine tenths of his work and where he needs full elbow room, head room and working room. ♦ Regardless of "paper claims" made by other manufacturers the fact remains that fittings are on the ends of a car and U. S. Lifts are wide

open at both ends. ♦ They were designed and built that way for that very purpose—to easily reach fittings without any obstructions. ♦ All mechanical parts of U. S. Lifts are completely housed and protected. No motors, cables, pulleys or other gadgets exposed to dust, dirt and water. ♦ Before you buy a lift check over the type used by the big operators. ♦ U. S. "Tailor Made" lifts cost no more than ordinary lifts. Be sure to investigate before you invest.

THE U. S. AIR COMPRESSOR COMPANY

5300 HARVARD AVENUE • CLEVELAND, OHIO

limit. In a legal proceeding by the policy-holder to require the insurance company to accept the late payment and reinstate the policy, the Court said:

"The failure to receive the premium notice is no excuse for non-payment. The assured knew, or was bound to know, when his premiums came due. The insurance company gives notice to policy-holders of the time of payment of premiums to aid their memory and to stimulate them to prompt payment. The company is under no obligation to give such notice and assumes no responsibility by giving it. The duty of the assured to pay on the proper date is the same, whether notice is given or not."

To avoid lapse of insurance protection the repairman should arrange a reminder file or system of premium dates. Even when the insurance company sends out premium notices faithfully, there is always the possibility of loss of the notice in transit or at least delayed delivery.

Approval of Unauthorized Deal

WHERE a repairman's agent or employe makes a deal for his employer which he was not authorized to make, the employer ordinarily may take it or leave it. That is, he may reject the deal or he may accept it even

though it was unauthorized in the first place. The usual rule is that the employer's ratification or acceptance of the unauthorized deal is binding upon him if he knows all the facts.

But sometimes an employer or principal may be bound by his acceptance of an unauthorized transaction, even where he does not know the full facts. The Pennsylvania Court put it this way:

"A principal can ratify the unauthorized act of his agent without full knowledge of all material facts if he intentionally and deliberately does so, knowing that he does not possess such knowledge and does not care to make further inquiry into the matter."

Best rule, of course, is to investigate fully before accepting or ratifying any unauthorized deal which an employe or agent may have negotiated.

Who Pays For Customer's Injury

IT is a well-established rule of law that a repairman must keep his business place safe for the use of customers and others coming there and that he is responsible for any injury suffered by a customer or other business visitor as a result of any "defect" on or in the business premises.

But suppose the repairman is oper-

ating in a rented building! Is he responsible for injuries to customers caused by defects or unsafe conditions in the building which he does not own? That rather troublesome question was recently raised in a New Hampshire case.

There the Court said that the landlord is responsible for injury to business visitors on the premises only when it results from an unsafe condition caused by the negligence of the landlord. That negligence must be a failure to make the premises safe before he turns the building over to the tenant or a failure to keep them safe while the tenant occupies the place. The Court also pointed out that a landlord cannot be held responsible for an injury to a visitor in the business building where the injury was caused by some carelessness on the part of the business tenant of the building.

The landlord is never responsible for injuries to business visitors in the building where those injuries result from some carelessness in the tenant's management, or in the operation of his business in the building. Under some conditions, the landlord might be responsible for injuries to business visitors resulting from defects in the building itself, but ordinarily a tenant has the duty either of repairing the

(Continued on page 64)

FOR Grey-Rock DEALERS

2. The World's Finest Servicing Data Makes Pleased Customers.



Troubleshooting, servicing and relining guide for all makes of brakes direct from engineers who design most new-car brake linings.

3. Balanced Brakesets Assure Profitable Customers.



Desirable mark-ups on engineered sets which give the quick, quiet, smooth stops and longer wear that car owners demand.

Grey-Rock BALANCED BRAKES

UNITED STATES ASBESTOS DIVISION of Raybestos-Manhattan, Inc., MANHEIM, PA.
BRAKE LININGS • CLUTCH FACINGS • FAN BELTS • HOSE • PACKINGS • RELINING EQUIPMENT

**A NEW DEVELOPMENT THAT MAKES
ALL OTHER WIPER BLADES *Obsolete!***

BALANCED PRESSURE

**A REVOLUTIONARY IMPROVEMENT IN
WINDSHIELD WIPER**

Blades

EVEN PRESSURE DISTRIBUTED ALONG LENGTH OF ENTIRE BLADE

**Eliminates streaking and
blurring. No jerky action or sticking**

The principle used in Lion's new Balanced Pressure Wiper Blade is radically new and different. Yet it is so logical, so scientifically sound that it is a wonder no one thought of it before. All previous wiper blades utilized but one point of pressure—in the center. This blade utilizes two points—one at either end, as shown in illustration above. This means that uniform, steady pressure is distributed along the entire length of the blade, allowing smooth, even action and preventing streaking, sticking, jerking and chattering. The construction of this blade is of finest quality with metal of rustproof stainless steel, double groove for added rigidity and strength, and either moulded rubber or Neoprene with 12 wiping edges. It fits all wiper arms. Write for further details.

7¼"—8¼"
—9" lengths

50¢

in rubber

65¢

in Neoprene

Also available in 10"—12"—
14"—and 16" lengths at slight
additional cost.

**HOLD
EVERYTHING!**

Wait for the new LION develop-
ments soon to be announced.

- ✓ **De-ICER Blade**
- ✓ **SLEET-SKAT Blade**
- ✓ **CLEARSIDE Wiper**

TWO NEW TYPES OF BLADES

Each with 12 wiping edges

1 Piece Moulded Rubber

1 Piece Durever Moulded
NEOPRENE

Pat. No. 2,153,224—2,149,037.
Other Pat. Pending

Prices to be maintained under the fair trade acts of all states in
which such acts are in effect.



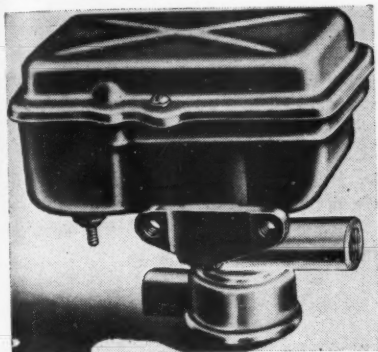
Another Contribution to *Safe Driving* by

LION PRODUCTS CO., LYNN, MASS., U. S. A.

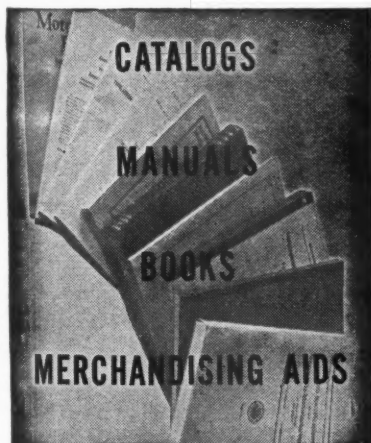
LION

S-W Electric Fuel Pump

Aimed at eliminating fuel delivery troubles, the Stewart-Warner Accessory Division, 1826 Diversey Parkway, Chicago, Ill., has introduced a new "lifetime" electric fuel pump. Claims for the performance of this new item are based on three points: Tungsten points sealed in hydrogen gas-filled glass tube to eliminate pit-



ting, sticking and burning; pumping mechanism is featured by a new friction-free armature, and pistons and bellows as well as all rotating action is eliminated; fuel can never enter the operating mechanism. Pumps are adjusted and sealed at the factory, and require no further attention, the manufacturer states.



A new 70-page catalog by The Imperial Brass Mfg. Co., 1200 W. Harrison St., Chicago, Ill., tells the story of the complete line of fittings and equipment made by the company, and also announces some new items: the "Sell More" fitting kits, a new filter line kit including both lines and fittings, a new low-priced flexible fuel line merchandiser, grease hose, battery testers and new dash control and soldering outfit merchandisers. Write for your copy.

Bulletin No. 43 by the South Bend Lathe Works, South Bend, Ind., illustrates and describes the three new models of the Workshop Precision Lathe, and the new improvements which have been added. Write for your copy.

For jobbers there is the new 26-page catalog by Lyon Metal Products, Inc., Aurora, Ill., covering the Lyon line of parts merchandisers, display and feature sales tables, service and

display counters, display panels with indirect lighting, wall shelving display units, lockers and cabinets. Also a line of shop equipment such as tool totes, stock carts and work desks. Prices and discounts have been revised. Copies of the new catalog will be sent upon request.

P. & D. Mfg. Co., Long Island City, N. Y., announce new catalogs covering P. & D. starting, lighting and ignition replacement parts, and New Type wire, cable tape and NOKRODE battery cable units.

A manual on the subject of body finishes has been prepared by the Ditzler Color Co., 8000 W. Chicago Blvd.,

Detroit, Mich. In it are given hints on the care of equipment, the preparation of metal for painting and the operation of spray painting that will be helpful to anyone interested in this important phase of service work. Copies may be obtained from Ditzler jobbers or direct from the Ditzler Color Co.

The 1939 edition of the B. F. Goodrich Co.'s "Operators Handbook" is now being distributed. Copies may be had by writing The B. F. Goodrich Co., Akron, Ohio. In it will be found a discussion of tire problems, features of tire building, and a complete description of Goodrich tires for trucks and buses, and for tractors.

ONLY ARCO GIVES YOU DOUBLE DUTY

Lacquer

CO-ZON

Transo

Transo

Now the ARCO COLOR MACHINE gives you both LACQUER and TRANSO

• A new important development makes the Arco Color Machine really TWO MACHINES IN ONE. The Arco Color Machine not only gives you lacquer colors for touching up all cars with lacquer finishes. It also gives you TRANSO for touching up cars having baked synthetic enamel finishes. TRANSO dries with the speed of lacquer and the gloss of synthetic enamel.

THE ONLY COMPLETE COLOR SERVICE

Arco Color Machine service is the ONLY COMPLETE color service. Yet it costs you far less than any other painting method. For only \$8 a year you can have in your own shop, either the Lacquer Machine which makes all colors since 1933 in Lacquer and TRANSO, or the Synite Machine which makes colors in synthetic enamel. Here's what they will mean to you—

(1) Big Savings in inventory; (2) All colors for all cars—pronto! (3) Just enough color for each job; (4) Half pints at gallon prices. This last feature alone will mean an increase in profits of more than \$25 a month, if you use only 3 pints of color a day. Ask your jobber or write today for details.

FOR ONLY \$8 A YEAR

You can lease an Arco Color Machine
For Your Own Shop.

THE ARCO COMPANY
CLEVELAND • LOS ANGELES

ARCO COLOR MACHINE

Mechanical Specifications

These Specifications Are Brought Up-to-Date Each Month by the

Line Number	MAKE AND MODEL	Lowest Priced 4-d. Sed. (Divd.)	Wheelbase (In.)	Tire Size (In.)	ENGINE															CHASSIS							
					No. of Cylinders, Bore and Stroke	Taxable Hp.	Piston Displacement (Cu. In.)	Maximum Brake HP. at Specified R.P.M.	Compression Ratio (to-1)	Displacement Factor %	Cylinder Head Material	Camshaft Drive Make	Piston Material	Oil Cleaner Make	Air Cleaner Make	Carburetor Make	Muffler Make	Electrical System Make	Battery Make	Clutch	Gearset Make	Universals Type and Make	Rear Axle Type and Make	Rear Axle Ratio	Front Spring Suspension		
																										Type and Make	
1	Bantam.....60	497½	75¼	5.00/15	4-2.2x3.0	7.75	45.6	20-4000	7.00	23.0	CI	Own	Als	No	Don	Til	Buf	AL	USL	P.Ro	WG	m-UP	½ Spi	5.25	Tr		
2	Buick.....39-40	996	120	6.50/16	8-3½x4½	30.6	248.0	107-3400	6.10	39.9	CI	LB	Ala	No	AC	Car	Wal	DR	Del	P.Own	Own	Rb-Mec	½ Own	4.44	IC		
3	Buick.....39-60	1246	126	7.00/15	8-3½x4½	37.8	320.2	141-3600	6.25	42.3	CI	LB	Ala	No	AC	Str	Wal	DR	Del	P.Own	Own	Rb-Mec	½ Own	3.90	IC		
4	Buick.....39-80	1543	133	7.00/16	8-3½x4½	37.8	320.2	141-3600	6.25	39.4	CI	LB	Ala	No	AC	Str	Wal	DR	Del	P.Own	Own	m-Spi	½ Own	4.18	IC		
5	Buick.....39-90	2074	140	7.50/16	8-3½x4½	37.8	320.2	141-3600	6.25	38.5	CI	LB	Ala	No	AC	Str	Wal	DR	Del	P.Own	Own	m-Spi	½ Own	4.55	IC		
6	Cadillac V8-39-61-60S	1680	126-127	7.00/16	8-3½x4½	39.2	346.0	135-3400	6.25	44.5	CI	Mor	Ala	No	AC	Str	Wal	DR	Del	P.Long	Own	Nb-Mec	½ Own	3.92	IC		
7	Cadillac.....V8-39-75	2995	141	7.50/16	8-3½x4½	39.2	346.0	140-3400	6.70	40.1	CI	Mor	Ala	No	AC	Str	Wal	DR	Del	P.Long	Own	Nb-Mec	½ Own	4.58	IC		
8	Cadillac-V-16...39-90	5140	141	7.50/16	16-3½x3½	67.6	431.0	185-3600	6.75	44.3	CI	Mor	Ala	No	AC	Car	Wal	DR	Del	P.Long	Own	Nb-Mec	½ Own	4.31	IC		
9	Chevrolet. Master 85	689	112½	6.00/16	6-3½x3½	29.4	216.5	85-3200	6.25	35.2	CI	Own	CI	No	AC	Car	Var	DR	Del	P.Own	Own	p-Own	½ Own	3.73	C		
10	Chevrolet. Mas. DeL.	720	112½	6.00/16	6-3½x3½	29.4	216.5	85-3200	6.25	39.2	CI	Own	Own	No	AC	Car	Var	DR	Del	P.Own	Own	p-Own	½ Own	4.22	IC		
11	Crosley.....	325½	80	.....	2-3x2½	.....	38.9	15-4200	5.00	.....	.....	CI	.....	.....	.....	Til	.....	AL	.....	P.Ro	WG	None	½ Spi	5.14	C
12	Chrysler...Roy. C-22	1010	119	6.25/16	6-3½x4½	27.3	241.5	100-3600	6.50	38.5	CI*	Mor	Ala	Pur	AC	Car	NS	AL	Wil	P.B&B	Own	Nb-UP	½ Own	4.10	IC		
13	Chrysler...Imp. C-23	1198	125	7.00/16	8-3½x4½	33.8	323.5	130-3400	6.80	42.5	CI*	Mor	MW	Pur	AC	Str	NS	AL	Wil	P.B&B	Own	Nb-UP	½ Own	3.91	IC		
14	Chrysler.Cus.Im.C-24	2595	144	7.50/16	8-3½x4½	33.8	323.5	132-3400	6.80	.....	Al	MW	Ala	Pur	AC	Str	NS	AL	Wil	P.B&B	Own	Nb-UP	½ Own	4.90	IC	
15	De Soto De L.&C. S-6	970	119	6.00/16	6-3½x4½	27.3	228.1	93-3600	6.50	37.7	CI*	Mor	Ala	Pur	AC	Car	NS	AL	Wil	P.B&B	Own	Nb-UP	½ Own	4.10	IC		
16	Dodge Sp. & DeL. D11	855	117	6.00/16	6-3½x4½	25.3	217.8	87-3600	6.50	38.3	CI	Mor	Als	Pur	AC	Str	NS	AL	AL	P.B&B	Own	Nb-UP	½ Own	4.10	IC		
17	Ford V8-60...922-A	665½	112	5.50/16	8-2.6x3.2	21.6	136.0	60-3500	6.60	30.7	Al	Dia	CS	No	Yes	Str	Own	O	Own	P	Own	m-Spi	¾ Own	4.44	Tr		
18	Ford V8-85...91-A	705½	112	6.00/16	8-3½x3½	30.0	221.0	85-3800	6.15	38.2	CI	Dia	CS	No	Yes	Str	Own	O	Own	P.Os	Own	m-Spi	¾ Own	3.78	Tr		
19	GrahamSpec.&Cus.96	965	120	6.00/16	6-3½x4½	25.3	217.8	90-3600	6.50	36.8	CI	LB	Als	No	Fram	AC	Mar	Old	DR	Wil	P.Long	WG	Nb-UP	½ Spi	4.27	C	
20	GrahamSc.&Cus.Sc97	1095	120	6.25/16	6-3½x4½	25.3	217.8	116-4000	6.70	Al	LB	Als	No	Fram	AC	Mar	Old	DR	Wil	P.Long	WG	Nb-UP	½ Spi	4.27	C	
21	Hudson 112...90-98	806	112	6.00/16	6-3x4½	21.6	175.0	86-4000	6.50	33.3	CI	GED	Al	No	AC	Car	Old	AL	Nat	P.Own	Own	Nb-Spi	½ Own	4.11	C		
22	Hudson.....91	854	118	6.00/16	6-3x5	21.6	212.0	96-3900	6.25	.....	CI	GED	Al	No	AC	Car	Old	AL	Nat	P.Own	Own	Nb-Spi	½ Own	4.11	C	
23	Hudson-Six...92	898	118	6.00/16	6-3x5	21.6	212.0	101-4000	6.25	38.1	CI	GED	Al	No	AC	Car	Old	AL	Nat	P.Own	Own	Nb-Spi	½ Own	4.11	C		
24	Hudson-C.C.Six...93	995	122	6.25/16	6-3x5	21.6	212.0	101-4000	6.25	36.3	CI	GED	Al	No	AC	Car	Old	AL	Nat	P.Own	Own	Nb-Spi	½ Own	4.11	C		
25	Hudson-C.C.8...95-97	1079	122, 129	6.50/16	8-3x4½	28.8	254.5	122-4200	6.25	40.9	CI	GED	Al	No	AC	Car	Old	AL	Nat	P.Own	Own	Nb-Spi	½ Own	4.11	C		
26	Hupmobile...6 R-915	895	115	6.00/16	6-3½x4½	29.4	245.3	101-3600	5.75	40.9	CI	Mor	Als	No	AC	Car	Old	AL	Wil	P.B&B	WG	m-Spi	½ Spi	4.27	C		
27	Hupmobile Six...922E	995	122	6.25/16	6-3½x4½	29.4	245.3	101-3600	5.75	41.8	CI	Mor	Als	No	AC	Car	Old	AL	Wil	P.B&B	WG	m-Spi	½ Spi	4.54	C		
28	Hupmobile, 8...925H	1145	125	6.50/16	8-3½x4½	32.5	303.2	120-3500	5.80	43.2	CI	Mor	Als	No	AC	Car	Old	AL	Wil	P.Long	WG	m-UP	½ Spi	4.54	C		
29	La Salle...V8, 39-50	1320	120	7.00/16	8-3½x4½	36.4	322.0	125-3400	6.25	41.7	CI	Mor	Ala	No	AC	Car	Wal	DR	Del	P.Long	Own	Nb-Mec	½ Own	3.92	IC		
30	Lincoln...V12	1360	136-145	7.50/17	12-3½x4½	46.8	414.0	150-3400	6.38	33.1	Al	Mor	Al	Pur	AC	Str	Old	AL	Exi	P.Long	Own	m-Spi	FF Tim	4.58	C		
31	Lincoln-Zephyr. 96H	1360½	125	7.00/16	12-2½x3½	36.3	267.0	110-3900	6.70	40.4	Al	Dia	CS	No	Fram	Str	Old	O	Own	P	Own	m-Spi	¾ Own	4.44	Tr	
32	Mercury...V8-99A	934½	116	6.00/16	8-3.187x3½	32.5	239.0	95-3600	6.15	36.9	CI	Dia	CS	.....	AC	Str	Own	O	Own	P.Os	Own	m-Spi	¾ Own	3.54	Tr	
33	Nash Lafay...3910	840	117	6.00/16	6-3½x4½	27.3	234.8	99-3400	6.30	37.6	CI	Whit	Als	No	AC	Str	Wal	AL	USL	P.B&B	Own	Nb-Mec	½ Own	4.10	C		
34	Nash...Amb. 6, 3920	985	121	6.25/16	6-3½x4½	27.3	234.8	105-3400	6.00	35.6	CI	Whit	Als	No	BS	AC	Str	Wal	AL	USL	P.B&B	Own	Nb-Mec	½ Own	4.10	C	
35	Nash...Amb. 8, 3980	1235	125	7.00/16	8-3½x4½	31.2	260.8	115-3400	6.00	34.9	CI	Dia	Als	BS	AC	Car	Wal	AL	USL	P.B&B	Own	Nb-Mec	½ Own	4.10	C		
36	Oldsmobile...60	889	115	6.00/16	6-3½x3½	28.4	216.0	90-3200	6.20	39.3	CI	Whit	Ala	No	AC	Car	Var	DR	Del	P.B&B	Own	Rb-Mec	½ Own	4.30	IC		
37	Oldsmobile...70	952	120	6.00/16	6-3½x4½	28.4	229.7	95-3300	6.10	39.7	CI	Whit	Ala	No	AC	Car	Var	DR	Del	P.B&B	Own	Rb-Mec	½ Own	4.30	IC		
38	Oldsmobile...80	1043	120	6.50/16	8-3½x3½	33.8	257.1	110-3500	6.20	41.6	CI	LB	Ala	No	AC	Car	Var	DR	Del	P.B&B	Own	Rb-Mec	½ Own	4.30	IC		
39	Overland-39	595½	102	5.00/16	4-3½x4½	15.6	134.2	61-3600	6.35	35.0	CI*	LB	Al	F-O	AC	Til	Mac	AL	USL	P.Long	WG	m-UP	½ Own	4.30	C		
40	Packard Six...1700	1095	122	6.50/16	6-3½x4½	29.4	245.3	100-3200	6.52	40.1	CI	Mor	Als	Pur	Op	CG	Wal	DR	Wil	P	Own	Nb-Mec	½ Own	4.54	IC		
41	Packard Eight-1701-2	1295	127, 148	7.00/16	8-3½x4½	33.8	282.0	120-3600	6.41	42.0	CI	Mor	Als	Pur	AC	Str	Wal	AL	PD	P	Own	Nb-Mec	½ Own	(b) IC			
42	Pack. Sup. 8...1703-5	2035	127, 148	7.00/16	8-3½x5	32.5	320.0	130-3200	6.45	44.1	CI	Mor	Als	Pur	AC	Str	Wal	AL	PD	P	Own	Nb-Mec	½ Own	(s) IC			
43	Pack. Twelve-1707-8	4155	134, 139	8.25/16	12-3½x4½	56.7	473.0	175-3200	6.30	44.1	Al	Mor	Als	Pur	AC	Str	Old	AL	PD	P	Own	Nb-Spi	½ Own	4.41	IC		
44	Plymouth...P7	726	114	5.50/16	6-3½x4½	23.4	201.3	82-3600	6.70	36.0	CI*	Mor	Ala	No	Al	Car	NS	AL	Wil	P.B&B	Own	Nb-UP	½ Own	3.90	IC		
45	Plymouth...P8	791	114	6.00/16	6-3½x4½	23.4	201.3	82-3600	6.70	35.9	CI*	Mor	Ala	Pur	Al	Car	NS	AL	Wil	P.B&B	Own	Nb-UP	½ Own	4.10	IC		
46	Pontiac 6...39-25	866	115	6.00/16	6-3½x4	28.3	222.7	85-3520	6.20	38.7	CI	Mor	CHI	No	AC	Car	Var	DR	Del	P.In	Own	Rb-Mec	½ Own	4.10	IC		
47	Pontiac 6...39-26	922	120	6.00/16	6-3½x4	28.3	222.7	85-3520	6.20	36.9	CI	Mor	CHI	No	AC	Car	Var	DR	Del	P.In	Own	Rb-Mec	½ Own	4.30	IC		
48	Pontiac 8...39-28	970	120	6.50/16	8-3½x3½	33.8	248.9	100-3700	6.20	41.2	CI	Mor	CHI	No	AC	Car	Var	DR	Del	P.In	Own	Rb-Mec	½ Own	4.30	IC		
49	Studebaker. Chamo.	740	.....	5.50/16	6-3x3½	21.6	164.3	78-4090	6.50	.....	CI	Dia	Ly	No	AC	Car	Wal	AL	Wil	P.B&B	WG	m-Spi	½ Spi	4.55	IT
50	Studebaker. Com. 9A	965	118½	6.00/16	6-3½x4½	26.3	226.0	90-3400	6.00	41.1	CI	Dia	Ly	No	Fram	AC	Str	Buf	Old	DR	Wil	P.B&B	WG	Nb-Spi	½ Spi	4.55	IT
51	Studebaker. Pres. 5C	1110	122	6.50/16	8-3½x4½	30.0	258																				

ABBREVIATIONS—General
 o—Others also
 *—Measured on rim of Flywheel
 (1)—22 on Ford V8, 21 on DeL. Ford V8.
 ½—Semi-floating
 ¾—Three-quarter floating
 †—With clearance of .015 the valve is .004 off its seat.
 ‡—Does not include Federal Taxes
 §—Computed on basis of displacement, gear ratio, effective tire

diameter, and weight with normal load.
 (a)—(¼ to ¾)
 A—Above (rods removed from)
 A—After top center
 AA—Automatic adjuster
 Ad—Advanced Al—Aluminum
 Ala—Aluminum, Anode processed
 Als—Aluminum with struts
 Au—Automatic
 (b)—4.36-1701; 4.70-1702
 B—Below (rods removed from)

B—Before top center
 Bm—Before marks on vibration damper
 (c)—1-½, 1-¾ C—Conventional
 C—Cold (Tappet clearance)
 Ch—Chain
 CHI—Chrome Nickel Iron
 CI—Cast Iron CS—Cast Steel
 CSM—Chain sprocket markings
 (d)—0+0-½ (e)—0+½-0
 (f)—½±½-0
 F—Floating (Piston Pin)

FF—Full Coating
 (g)—¾ above pin, ½ below.
 H—Hot (tappet clearance)
 (h)—4900-5100 IC—Independent coil
 IT—Independent Transverse Ly—Lynite
 m—Metal with anti

Tune-Up Specifications

Car Manufacturers and Supersede All Others Previously Published

Service Brake Make and Type	Steering Gear Make	Compression Pressure at Cranking Speed (Lbs.)	Spark Plug Make and Type	RINGS		Piston Pin Diameter	Piston Pin Locked In	VALVES				IGNITION				Rods Removed From	Crankpin Diameter (Ins.)	Crankpin Length (Ins.)	Capacity Crankcase (Qts.)	Capacity Cooling System (Qts.)	FRONT AXLE				Line Number								
				No. and Width Comp.	No. and Width Oil			Head Diameter and Seat Angle		Operating Tappet Clearance	Intake Valve Clearance for Valve Timing	Intake Valve Opens Before or After T.C.	Breaker Points Gap (Ins.)	Timing							Caster (Degrees)	Camber (Degrees)	Toe-In (Inches)	King Pin Inclination (Degrees)									
								Inlet (Ins.)	Exhaust (Ins.)					Inlet (Ins.)	Exhaust (Ins.)											No. of Flywheel Teeth	Spark Occurs °TC						
OM R	125 AL-A9	2-3/4	1-1/2	2-3/4	1-1/2	R	1-3/4	45	1-3/4	45	.279	.011H	.012H	.011	19B	4/16	.022	.025	TC	TC	Au	A	1-1/8	1-1/4	3	4	11	1/4	1-1/8	1-1/2	1 1/2	1	
OH S	112 AC-46	2(c)	2-3/4	2-3/4	1-1/2	R	1-1/4	45	1-1/4	45	.372	.015H	.015H	13B	5/16	.015	.025	4B	1 1/2	Au	A	2	1-21	6	13 1/4	N 1 1/2	-1/4 +1	0-1/8	3-4 1/2	2	3		
OH S	114 AC-46	2(c)	2-3/4	2-3/4	1-1/2	R	1-1/4	45	1-1/4	45	.372	.015H	.015H	14B	5/16	.015	.025	6B	2 1/2	Au	A	2 1/4	1-31	8	17	N 1 1/2	-1/4 +1	0-1/8	3-4 1/2	4	5		
OH S	114 AC-46	2(c)	2-3/4	2-3/4	1-1/2	R	1-1/4	45	1-1/4	45	.372	.015H	.015H	14B	5/16	.015	.025	6B	2 1/2	Au	A	2 1/4	1-31	8	17	N 1 1/2	-1/4 +1	0-1/8	4-5 1/2	4	5		
BH S	155x AC-104	2(c)	2-3/4	2-3/4	1-1/2	F	1.88	45	1.63	45	.341	AA	AA	AA	TC	TC	.015	.027	5B	2 1/4	Au	A	2.46	2-3/4	7	25	(nn)	(np)	1-3/8	(nr)	6	7	
BH S	170x AC-104	2(c)	2-3/4	2-3/4	1-1/2	F	1.88	45	1.63	45	.341	AA	AA	AA	TC	TC	.015	.027	5B	2 1/4	Au	A	2.46	2-3/4	7	25	0-1/8	0-1/8	1-3/8	5" 1'	7	8	
BH S	180x AC-104	2(c)	2-3/4	2-3/4	1-1/2	R	1.50	45	1.37	45	.341	AA	AA	AA	6B	2 1/2	.015	.032	6B	2 1/2	Au	A	2	1-3/4	11	30	0-1/8	0-1/8	1-3/8	5" 1'	8	9	
OH O	AC-44	2-1/8	1-1/2	2-1/8	1-1/2	.865	R	1-1/4	30	1-1/4	30	.340	.006H	.013H	.006	9B	3/16	.021	.040	5B	2B	Au	A	2 1/8	1-1/8	5	14	2 1/4 ± 1/2	1 ± 1/2	1-1/8	7° 10'	9	10
OH O	AC-44	2-1/8	1-1/2	2-1/8	1-1/2	.865	R	1-1/4	30	1-1/4	30	.340	.006H	.013H	.006	9B	3/16	.021	.040	5B	2B	Au	A	2 1/8	1-1/8	5	14	0 ± 1/2	N 1 ± 1/2	0-1/8	4 3/4	10	11
HM R	AL	2-1/8	1-1/2	2-1/8	1-1/2	.865	F	1-1/4	30	1-1/4	30	.340	.006H	.013H	.006	9B	3/16	.021	.040	5B	2B	Au	A	2 1/8	1-1/8	5	14	2				11	11
LH G	145x AL-A7	2-1/8	2-3/4	2-1/8	2-3/4	.865	F	1-1/4	45	1-1/4	45	.340	.008H	.010H	.014	8B	3/16	.020	.025	TC	TC	Au	A	2 1/8	1-1/8	5	17	1 1/2 - 2 1/2	(a)	0-1/8	4 1/2 - 6	12	13
LH G	155x AL-A7	2-1/8	2-3/4	2-1/8	2-3/4	.865	F	1-1/4	45	1-1/4	45	.340	.008H	.010H	.011	6B	2 1/2	.018	.025	TC	TC	Au	A	2 1/8	1-1/8	6	24	N 1 1/2 + 1 1/2	-1 to +1	0-1/8	5 1/2 - 7	13	14
LH G	155x AL-A7	2-1/8	2-3/4	2-1/8	2-3/4	.865	F	1-1/4	45	1-1/4	45	.340	.008H	.010H	.011	6B	2 1/2	.018	.025	3B	1 1/4	Au	A	2 1/8	1-1/8	6	24	-1 to +1	-1 to +1	0-1/8	4 1/2 - 6	14	15
LH G	145x AL-A7	2-1/8	2-3/4	2-1/8	2-3/4	.865	F	1-1/4	45	1-1/4	45	.340	.008H	.010H	.014	8B	3/16	.020	.025	2B	3/4	Au	A	2 1/8	1-1/8	5	19	1 1/2 - 2 1/2	(a)	0-1/8	4 1/2 - 6	15	16
LH G	140x AL-A7	2-1/8	2-3/4	2-1/8	2-3/4	.865	F	1-1/4	45	1-1/4	45	.340	.006H	.008H	.011	6A	2 1/2	.020	.025	TC	TC	Au	A	2 1/8	1	5	15	N 1 1/2 + 1 1/2	N 1 1/2 - 1 1/2	0-1/8	5 1/2 - 6 1/2	16	17
LH G	150x Ch-H-10	2-3/4	1-1/2	2-3/4	1-1/2	.687	F	1.28	45	1.28	45	.279	.013C	.013C	.013	9 1/2	3/16	.015	.025	4B	1 1/2	Au	A	1.60	1.54	4	15	8	1	1/8	8	17	18
LH G	100 Ch-H-10	2-3/4	1-1/2	2-3/4	1-1/2	.750	F	1-1/4	45	1-1/4	45	.310	.013C	.013C	.013	TC	TC	.015	.025	4B	1 1/2	Au	A	2	1.75	5	(1)	8	1	1/8	8	18	19
OH R	120 Ch-H-10	2-3/4	2-3/4	2-3/4	2-3/4	1-1/2	R	1-1/2	30	1-1/2	45	.341	.010H	.010H	.012	4 1/2	1 1/2	.018	.025	TC	TC	Au	A	2 1/8	1-1/8	5	14	3-4	1	1/8 - 3/8	7 1/2	20	21
OH R	130 Ch-H-10	2-3/4	2-3/4	2-3/4	2-3/4	1-1/2	R	1-1/2	30	1-1/2	45	.341	.010H	.010H	.012	4 1/2	1 1/2	.018	.025	4 1/2	1 1/2	Au	A	2 1/8	1-1/8	5	14	3-4	1	1/8 - 3/8	7 1/2	19	20
BH G	115 Ch-J-8	2-3/4	2-3/4	2-3/4	2-3/4	1-1/2	F	1-1/2	45	1-1/2	45	.341	.006H	.008H	.010	10 1/2	3B	.020	.032	2 1/2	9 1/2	Au	A	1-1/8	1-1/8	4	12 1/2	1 1/2 ± 1/2	1-1 1/2	0-1/8	7	21	22
BH G	120 Ch-J-8-A	2-3/4	2-3/4	2-3/4	2-3/4	1-1/2	F	1-1/2	45	1-1/2	45	.341	.006H	.008H	.010	10 1/2	3B	.020	.032	TC	TC	Au	A	1-1/8	1-1/8	4	12 1/2	1 1/2 ± 1/2	1-1 1/2	0-1/8	7	23	24
BH G	120 Ch-J-8	2-3/4	2-3/4	2-3/4	2-3/4	1-1/2	F	1-1/2	45	1-1/2	45	.341	.006H	.008H	.010	10 1/2	3B	.020	.032	TC	TC	Au	A	1-1/8	1-1/8	4	12 1/2	1 1/2 ± 1/2	1-1 1/2	0-1/8	7	22	23
BH G	120 Ch-J-8	2-3/4	2-3/4	2-3/4	2-3/4	1-1/2	F	1-1/2	45	1-1/2	45	.341	.006H	.008H	.010	10 1/2	3B	.020	.032	TC	TC	Au	A	1-1/8	1-1/8	4	12 1/2	1 1/2 ± 1/2	1-1 1/2	0-1/8	7	24	25
BH G	118 Ch-J-8	2-3/4	2-3/4	2-3/4	2-3/4	1-1/2	F	1-1/2	45	1-1/2	45	.341	.006H	.008H	.010	10 1/2	3B	.017	.032	TC	TC	Au	A	1-1/8	1-1/8	7	17.2	1 1/2 ± 1/2	1-1 1/2	0-1/8	7	25	26
LH G	107 Ch-7	2-1/8	2-3/4	2-1/8	2-3/4	.750	F	1-1/4	45	1-1/4	45	.341	.010	.013	.013	2B	1/2	.022	.028	7B	2 1/4	Au	A	2 1/8	1-1/8	6	18	1 1/2	1	1/8 - 3/8	7 1/2	27	28
LH G	107 Ch-7	2-1/8	2-3/4	2-1/8	2-3/4	.750	F	1-1/4	45	1-1/4	45	.341	.010	.013	.013	2B	1/2	.022	.028	7B	2 1/4	Au	A	2 1/8	1-1/8	6	18	1 1/2	1	1/8 - 3/8	7 1/2	27	28
LH G	113 Ch-7	2-1/8	2-3/4	2-1/8	2-3/4	.750	F	1-1/4	45	1-1/4	45	.341	.006	.013	.010	1B	1/2	.015	.028	7B	2B	Au	A	2 1/8	1-1/8	8	21.5	1 1/2	1/4	1/8 - 3/8	8 1/2	28	29
BH S	155x AC-104	2(c)	2-3/4	2-3/4	1-1/2	.865	F	1.88	45	1.63	45	.341	AA	AA	AA	TC	TC	.015	.027	5B	2 1/4	Au	A	2 1/8	2-3/4	7	...	N 1 1/2 - 2 1/4	0-3/4	1-3/8	5" 6'	29	30
OM O	105 Ch-7	2-1/8	2-3/4	2-1/8	2-3/4	.750	F	1-1/4	45	1-1/4	45	.341	AA	AA	AA	21B	6 1/2	.020	.029	7B	2 1/4	Au	B	2 1/8	2	12	32	1	1/8 - 1/2	7 1/2	30	31	
BH G	105 Ch-H-10	2-3/4	2-3/4	2-3/4	2-3/4	1-1/2	F	1.53	45	1.53	45	.311	AA	AA	AA	19 1/2	6B	.015	.029	4B	1 1/4	Au	A	2 1/8	1.57	5	30	4	3/4	1/8	4	31	32
BH G	Ch-H-10	2-3/4	2-3/4	2-3/4	2-3/4	1-1/2	F	1-1/4	45	1-1/4	45	.310	.013C	.013C	.013	TC	TC	.015	.025	4B	1 1/4	Au	A	2.14	1.75	5	21	8	1	1/8	8	32	33
BH G	110 AL-B7-A	2-1/8	2-3/4	2-1/8	2-3/4	.750	F	1-1/4	45	1-1/4	45	.340	.015	.015	.015	21 1/2	6B	.020	.025	TC	TC	Au	A	2	1.42	6	20	1-2	0-1 1/2	0-1/8	7	33	34
BH G	125 AC-45	2-1/8	2-3/4	2-1/8	2-3/4	.750	F	1-1/4	45	1-1/4	45	.340	.015	.015H	.015	24 1/2	7B	.020	.025	6B	1 1/2	Au	A	2	1.42	6	16	1-2	0-1 1/2	0-1/8	7	34	35
BH G	110 AC-45	2-1/8	1-1/2	2-1/8	1-1/2	.750	F	1-1/4	45	1-1/4	45	.372	.015H	.015H	.015	20B	6B	.020	.025	9B	3/4	Au	B	2	1.24	7	17	1-2	0-1 1/2	0-1/8	7	35	36
BH S	151x AC-45	2-3/4	2-3/4	2-3/4	2-3/4	1-1/2	P	1-1/2	30	1-1/2	45	.341	.008H	.011H	.011	5B	2B	.020	.040	TC	TC	Au	A	2 1/8	1-1/8	5	17	0-N 3/4	1/2 - 1	1/8 - 3/8	4" 51'	36	37
BH S	146x AC-45	2-3/4	2-3/4	2-3/4	2-3/4	1-1/2	P	1-1/2	30	1-1/2	45	.341	.008H	.011H	.011	5B	2B	.020	.040	TC	TC	Au	A	2 1/8	1-1/8	5	17	0-N 3/4	1/2 - 1	1/8 - 3/8	4" 51'	37	38
BH S	152x AC-45	2-3/4	2-3/4	2-3/4	2-3/4	1-1/2	P	1-1/2	30	1-1/2	45	.341	.008H	.011H	.011	TC	TC	.015	.030	2B	3/4	Au	A	2 1/8	1-1/8	6	24	0-N 3/4	1/2 - 1</				

Classified Ads

Keep Shop Busy

Continuous use of classified advertising in the local newspapers for the past two years has brought in enough repair work to make it a profitable investment for Dorney's Garage in Allentown, Pa.

G. N. Herbster, owner-manager of the business, has tried a number of different offers but for more than a year has been using three different ads which have brought the greatest returns during the experimental period.

During inspection periods he runs a "front end rebushed" ad more frequently because he has found that

many cars require this service before they can pass inspection. After inspection periods are over he runs the other two ads to develop general overhaul business.

He estimated that for every classified ad he has run during the past two years he has been rewarded with two repair jobs. Many of these customers return regularly and also recommend the shop to their friends.

The shop is operated on a strictly cash basis. Herbster believes it is more profitable to quote a slightly lower price for cash than to get a higher price on credit terms because of the losses that must be absorbed on bad accounts and the cost of making collections.

The shop is also listed in the tele-

phone directory's classified section but he has been able to trace very few jobs to this source. Advertisements in local lodge and curb papers bring in sufficient business to pay for this expense, he reports.

"The reason I decided to try classified advertising in the newspapers," he said, "is because our shop is located on a side street and we cannot depend on location or traffic for advertising. I believed that advertising would overcome the handicap of location and results prove that it has had such an effect. I have always been an advocate of advertising and in our shop it has been the means of bringing in enough work to keep three men busy at all times."

When asked whether this type of advertising attracted only owners of old cars, Herbster replied: "We get every type of car that may be found in the average garage. Our advertising seems to appeal to owners of both old and new cars."



**—money couldn't buy
this service, yet it
costs you nothing !**

REPAIRMEN from coast to coast are enthusiastic in their praise of Standard's exclusive "Dealer Co-operation Service." And with good reason, for it has put new life into the electrical end of their business.

There's no charge or obligation for this Service. It's absolutely FREE to all Registered Standard Dealers.

A factory-trained "good will" man calls on you from time to time. He will answer many questions you have always been wanting to write about but have never found time to get to. Valuable information and practical facts that will aid you in developing this branch of your business.

He will "tidy up" your stock—help you to display it to good advantage—show you new important items—and see that you have the very latest Catalogs, Price Lists and Monthly Service Bulletin of valuable facts.

He will also put up wall posters—aid you in making attractive window displays—apply transfers to your doors or windows—and show you how to get full sales-producing value from our powerful battery of FREE Dealer Selling Helps.

Our Dealer Co-operation Service is only one of the many features of our extensive Dealer Help Plan. Let us tell you how easy it is to become a Registered Standard Service Station and get all of the valuable features of this sales-building program, FREE.

STANDARD MOTOR PRODUCTS, INC.

MAIN OFFICE AND FACTORY
37-18 NORTHERN BLVD. LONG ISLAND CITY, N. Y.



**Manufacturers of
the Famous
"BLUE STREAK"
LINE**

**Ignition Parts
Battery Cables
Automotive Wire**

Stewart-Warner

Appoints McCall

As the result of a recent reorganization of the Stewart-Warner accessory sales division, Maurice G. McCall has been appointed to direct the newly-formed technical department, according to George Zahn, Stewart-Warner accessory sales manager.

Prior to his present advancement, McCall was in the service department of the Stewart-Warner Corp. In his new position he will be responsible for the preparation of specifications, cataloging, and pricing of Stewart-Warner accessories.

Self-Tapping Screws

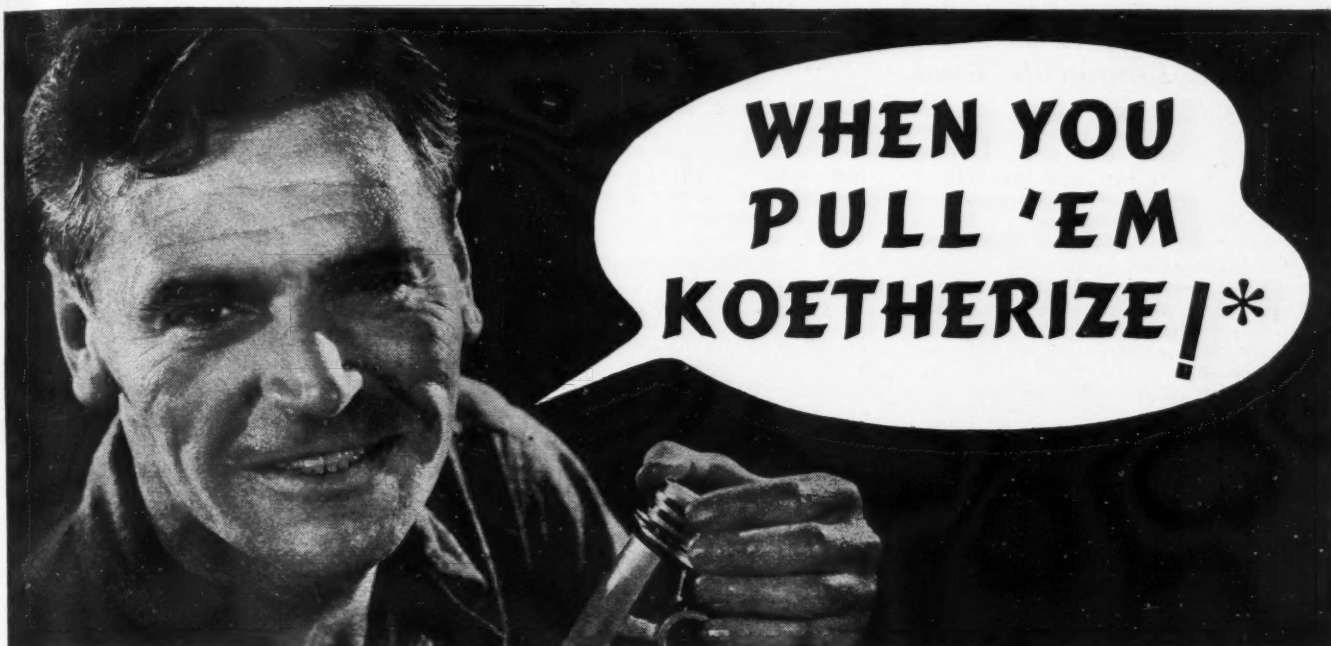
Assortment

A handy assortment covering all of the various sizes of self-tapping metal screws used in current automobile production is offered by Parker-Kalon Corp., 200 Varick St., New York City. Prepared especially for the automobile body builders, trim and repair shops, and supplied in a handy metal cabinet. Priced at \$5.50.



**"He wrote to Motor Age
Clearing House!"**

"The ABILITY to serve well is as important as the WILL to do so."



* In hundreds of shops all over the country there is one watchword on ring jobs . . . Koetherize. Regardless of the piston rings used . . . regardless of the condition of the cylinder or the piston . . . Koetherizing is the one answer to satisfaction on ring jobs.

Koetherizing gives a permanent repair to collapsed piston skirts and scientifically supplies original factory fit. This unique and exclusive process eliminates "spring" expanders and questionable gadgets. Metallurgists testify that it actually improves the piston because a piston once Koetherized will not collapse again. Most surprising of all, Koetherizing costs no more than the use of ordinary skirt expanders.



When you Koetherize every piston you pull you can be sure that every ring job will be a better job. Customers will be quick to appreciate their quieter running engines and new car performance. Remember, that no matter what kind of piston rings you use . . . Koetherizing makes every ring job a better job. Over 500 jobbers are equipped for Koetherizing service. Write today for the name of one near you.

KOPPERS COMPANY, American Hammered Piston Ring Division, Baltimore, Md.

KOETHERIZING

A national service available through jobbers of
AMERICAN HAMMERED PISTON RINGS

Fire Halts Jenkins'

Bonneville Trial

Ab Jenkins' assault on his own 24-hr. speed record at Bonneville Saltbeds was brought to a sudden halt on July 27 when his car burst into flames during a pit stop. Mechanics who ripped open the closed cockpit of the car and dragged out Jenkins, whose clothing was ablaze, narrowly averted a tragedy. Jenkins suffered burns the full length of his right arm and along the calf of his right leg, but the flames were smothered before they inflicted critical injury.

The accident occurred on the 51st

lap (637.5 miles). Troubled by a howling engine noise Jenkins pulled into the pit for a check by his mechanics. The crew failed to discover the cause and, as Jenkins started off again, the fire occurred. Jenkins' clothes had become soaked with gasoline from a leaky hand pump in the cockpit and caught fire. The driver tried an emergency trap door but it would not work; his crew tore the hood from the cockpit and drew him to safety.

Investigation indicated a joint on the "Mormon Meteor" drive shaft had caused the initial trouble and had also been indirectly responsible for the fire. Mechanics estimated several

days would be necessary to make repairs.

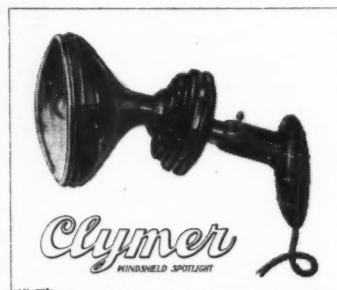
At the time of the fire the following new records were established, subject to official ratification: 500 km.—177.11 m.p.h.; 500 miles—171.31 m.p.h.; 1000 km.—172.3 m.p.h.; 3 hr.—171.4 m.p.h.

Gas Tank Cap Has New Features

The new Quinplex gas tank cap is designed to eliminate loss of gasoline by evaporation, vapor lock trouble, excessive crankcase dilution and to provide quicker starting and better engine performance. It is constructed with twin valves, one to admit air to the tank and the other to permit a build up of pressure under 3 pounds within the tank. This pressure acts as an auxiliary pump to force gasoline to the engine. Quinplex caps are available with a new anti-theft anchor which prevents theft of the cap and also the gasoline. Made by the Quinplex Corp., 429 Fourth Ave., Pittsburgh, Pa.

Spotlight Mounts Through Windshield Glass

A new style Clymer spotlight which mounts through the windshield glass has been announced by The Clymer Spotlight Co., 222 West Pico St., Los Angeles, Cal. A 3-in. hole is cut in the glass, and the light installed on the outside, with a



handle for universal movement on the inside. A feature of the light is that it can be quickly detached for use as a trouble light. One universal bracket fits any make of car. List price, \$9.50.



"Yes, sir—we do greasing—drive right over Mr. Jenks here!"

THEY BOTH FOUND THE SAME TROUBLE—BUT—ONLY ONE WAS SMART ENOUGH TO CASH IN ON IT!

MILLIONS of cars are running with worn shocks—every one a prospect for a link replacement or a rebush job at a nice profit. Smart repairmen go after this business and get it! It's easy to convince the car owner that this service is necessary for safety and driving comfort.

There's good money in Shock Repair. Hygrade's greatly expanded line gives you a broad coverage that meets practically every demand. Our **NEW SHOCK PARTS CATALOG**—FREE with any low priced assortment—again features Hygrade's famous Tel-O-Vision Car Guide System, for the instant and accurate spotting of any desired part.

Ask your jobber for Hygrade Shock parts. If he can't supply you send us his name.

HYGRADE PRODUCTS CO.
516 West 34th Street, New York

"Don't BUY Labor—SELL it"

Do your own work with
HYGRADE REPLACEMENT PARTS FOR
Carburetors
Fuel Pumps
Speedometers
Shock Absorbers
Temperature Gauges
Fuel Lines and Fittings.

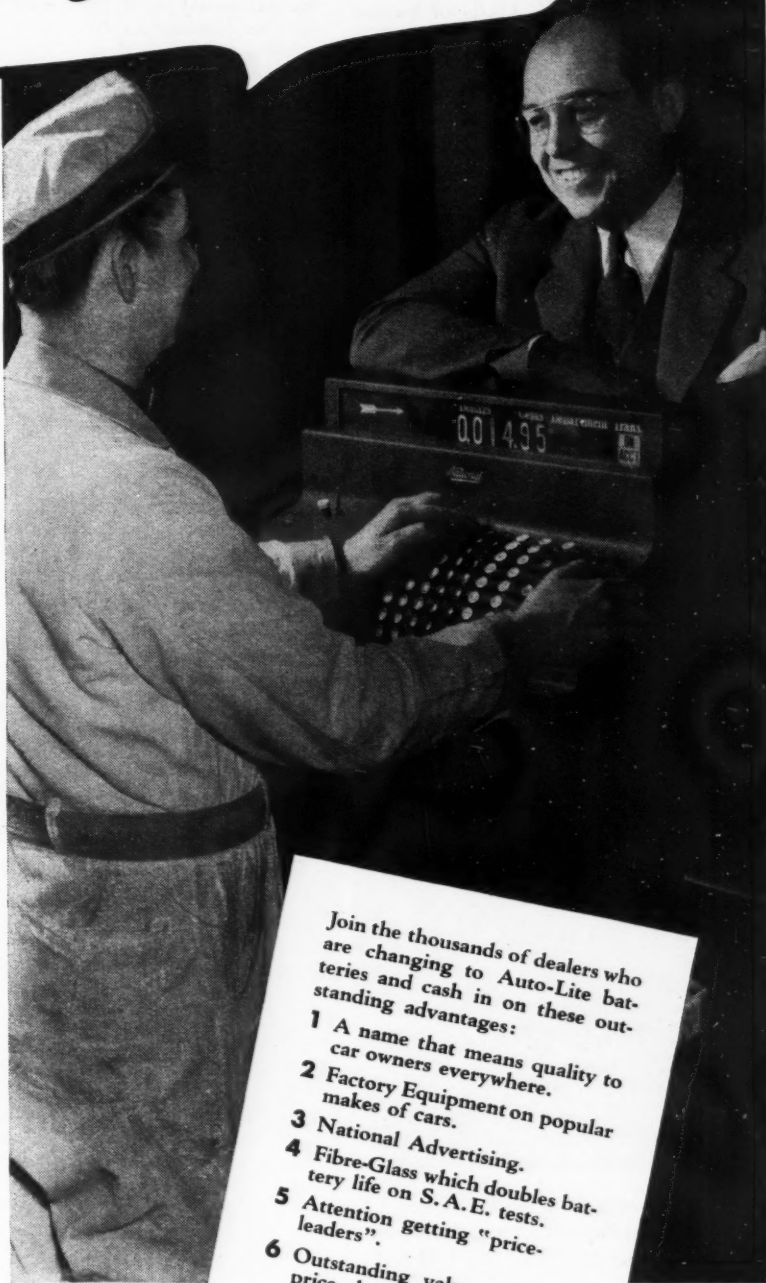


I'll say we're making more money!

● "Just sold another Auto-Lite Fibre-Glass battery and believe me, the extra profit isn't a bit hard to take. When you show customers how Fibre-Glass actually doubles battery life on S.A.E. tests—that's the battery they want to buy! Look how Fibre-Glass helped us get the business of those two fleet accounts.

"And look at the new business we've been getting in because Auto-Lite batteries are factory equipment on popular makes of cars. That Auto-Lite 'Price-Leader' battery has been bringing in customers, too. It brought in a fellow yesterday and he bought an oversize battery, thanks to the Auto-Lite 'Sell-Up' Plan.

"You know, Auto-Lite is a great name to sell. With the millions of dollars Auto-Lite have spent on advertising and with their products used as factory equipment on 1 out of every 3 new cars, people certainly know they build dependable products. We sure did the right thing when we took on Auto-Lite batteries."



Join the thousands of dealers who are changing to Auto-Lite batteries and cash in on these outstanding advantages:

- 1 A name that means quality to car owners everywhere.
- 2 Factory Equipment on popular makes of cars.
- 3 National Advertising.
- 4 Fibre-Glass which doubles battery life on S.A.E. tests.
- 5 Attention getting "price-leaders".
- 6 Outstanding values in every price class.
- 7 A "Sell-Up" Plan that boosts profits.

Phone your Auto-Lite Battery Jobber or write USL Battery Corporation, Niagara Falls, N. Y.

AUTO-LITE Batteries

Soon—The Plastic Car

An automobile, with the top made entirely of transparent plastic, has been developed by the Briggs Manufacturing Co. for the Chrysler Corp. and will be on display at the Chrysler Motors Building at the World's Fair in New York. Plastics will be used more and more for all kinds of parts in the automobile. Briggs, under the direction of John Tjaarda, head of their Design Research Department, has done considerable work in developing a new plastic to be used for automobile construction.

With this new material, which is claimed to be stronger than steel, con-

siderably more crash-proof, and very tough without being brittle, the all-plastic automobile body is visualized not far off. Those bodies will weigh only one-half the weight of the present steel bodies, and owing to the low cost of this plastic, which is called "Steelplast," will not be more costly than steel. "Monosteel" construction, as pioneered by Briggs, and now used in the Lincoln-Zephyr, is to be used in the plastic bodies. This construction eliminates the conventional frame, and the body will be a self-supporting unit made entirely of "Steelplast."

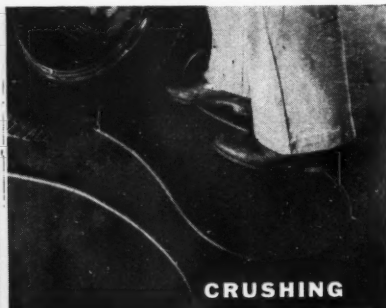
Where ordinary steel for bodies has approximately a tensile strength

of 44,000 pounds per square inch, "Steelplast" has a tensile strength of 52,000 pounds per square inch. It is not a laminated material but contains wood fiber. When still in slush form, the plastic is polarized, through which treatment the fibers are laid lengthwise. Tjaarda states that eventually the material can also be used for bearings, cylinder blocks, transmission cases, rear axle housings, wheels, fans, and many other mechanical parts. It has only twice the expansion of steel, but will not corrode or deteriorate. It does not warp, and is a sound and heat insulator. Bodies made of "Steelplast" can be painted in synthetic enamel without using a primer coat. At the same time they will be cooler in summer and warmer in winter.

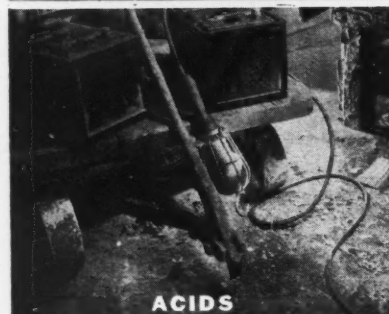
EVEN WHEN *Oil Soaked* NEOPRENE-JACKETED DROP CORD WILL WITHSTAND ALL THIS GRIEF



SCUFFING



CRUSHING



ACIDS



GENERAL WEAR & TEAR

SURE, ordinary drop cord will take its share of scuffing, crushing, and banging around when it's new. But will it do this when it's oil-soaked and softened by contact with oil and grease? It's when it is oil-soaked that neoprene-covered drop cord shows its superior resistance to general wear and tear. That's why neoprene-covered drop cord is worth the difference in cost.

Next time you order drop cord from your regular supplier, be sure to specify neoprene-covered cord. You'll save money in the long run. Complete list of manufacturers supplied on request. Write E. I. du Pont de Nemours & Co., Inc., Rubber Chemicals Division, Wilmington, Delaware.

Ask your supplier for



NEOPRENE

JACKETED DROP CORD

or write us for a list of manufacturers

E. I. du Pont de Nemours & Co., Inc.
Rubber Chemical Div., Wilmington, Del.

I am interested in knowing more about neoprene-covered drop cord. Please send me a list of manufacturers.

Name _____
Address _____
City _____
State _____

Willard Batteries Have Fill Control

Designed to prevent over-filling of batteries, the new Willard batteries are fitted with a new device. When the filler plug is removed from the well before adding water, it is fitted over an air-vent through which gases



normally escape. This forms an air lock in the breather chamber beneath the plugged vent as the fluid rises. When the filling well fluid level nearly reaches the top, the plug is removed from the vent. This breaks the air lock, and the fluid recedes in the filling well to the exact correct level. Willard batteries are made by the Willard Storage Battery Co., 246 East 131st St., Cleveland, Ohio.

Champion Prize Money For Midget Drivers

Prizes totalling \$500 are to be awarded to drivers whose cars are equipped with Champion Spark Plugs in each of the following National Championship Midget events: Final Eastern Championship (at a track to be designated later), Final Western Championship (Gillmore Speedway, L.A.), Mid-season National Championship (Mineola, N. Y.), National Park Track Championship (Soldiers Field, Chicago).

The prize money will be distributed as follows to drivers using Champion plugs and finishing in the first ten places at each of the respective events: 1st place—\$150; 2nd—\$100; 3rd—75; 4th—\$50; 5th—\$40; 6th—\$30; 7th—\$20; 8th—\$15; 9th—\$10; 10th—\$10.

The matter of prizes for any further national championship events that may be run under the sanctions of the AAA will be given consideration after such sanctions have been granted.

NO LAWYER CAN OUTSMART YOU



...when it comes to automobiles!

Here's why men who are smart enough in their own line often expect the impossible from the service man:

WANT A GOOD LAUGH? Just listen to customers explain what's the matter with their cars.

They telephone in to say they're "stuck" . . . and give no hint as to whether it's the battery, the transmission or the simple fact that they're out of gas. They tell you about a "funny noise" . . . and leave you to guess whether it's a squeaking fan-belt, a burned-out bearing, or just a good old-fashioned "ping" that developed when the lady of the family got a "bargain" in low-grade gasoline.

And likely as not, they'll expect their car to give first-grade performance on this same low-grade gas. We think you can save yourself, and your men, a lot of time and trouble by asking just one simple question before you so much as lift the hood. That question is:

"What grade of gasoline do you use?"

Since you can't advance the spark any farther than the anti-knock quality of the gasoline permits . . . and since performance depends on spark setting . . . you might just as well tell them what they can expect right from the beginning. It certainly will save you a lot of arguments and trouble when customers know what to expect in advance.

YOUR CUSTOMERS HAVE THESE 3 CHOICES



BEST PERFORMANCE—with gasoline marked "Ethyl" on the pump or globe. It is highest in anti-knock and all-round quality. Contains enough tetraethyl lead so that the engine's spark can be *advanced* closest to the point of maximum power and economy without "knock" or "ping."



GOOD PERFORMANCE—with "regular" gasoline, which permits the spark to be considerably advanced without "knock" or "ping." Most "regular" gasolines now contain tetraethyl lead, as shown by the "Lead" signs on the pumps.



POOR PERFORMANCE—with low-grade gasoline, poor in anti-knock quality. With low-grade gasoline in a modern car, the engine's spark must be *retarded*—which means *loss* of power and economy.

"TUNE-UP TIME" goes back on the air Monday night, Aug. 21, over Columbia Broadcasting System. 7 P. M., E. S. T.

ETHYL GASOLINE CORPORATION, manufacturer of anti-knock fluids used by oil companies to improve gasoline

MOTOR AGE, August, 1939

When writing to advertisers please mention Motor Age

Chevrolet Shifter

(Continued from page 12)

between the upper face of the guide and the end of the shift control shaft (Fig. 6). Install the guide lock nut and tighten it securely.

10—To adjust the mast jacket for proper height, loosen the mast jacket clamp at the steering gear housing and measure from the shoulder on the mainshaft to the end of the mast jacket (Fig. 7). This measurement should be 1 17/64 in. on Master DeLuxe and 23/32 in. on the Master "85" models. Move the mast jacket up or down to secure this measurement.

11—Turn the mast jacket until the gearshift control shaft is in the center of the hole in the instrument panel bracket. Install the nuts on the steering column to instrument panel bracket and tighten securely. Then tighten the mast jacket clamp at the steering gear housing.

12—On Master DeLuxe Models, install the mast jacket bearing retaining spring. Install the steering wheel. Again check and make sure the control and selector shafts move freely.

ADJUSTMENT OF CONTROL RODS

Selector

Pull the selector control rod forward until the transmission interlock

bottoms firmly against its stop. In this position, adjust the swivel by screwing it up or down on the rod until the pin on the swivel is 1/8 of an inch to the rear of the hole in the lever. Tighten the lock nut up against the swivel. Pull the lever toward the rear and connect the rod, install the anti-rattle spring, flat-washer, and cotter pin onto the swivel pivot pin.

NOTE—PULLING THE SELECTOR CONTROL LEVER BACKWARD INSURES SPRING TENSION ON ALL SELECTOR PARTS, RETAINING THE SELECTOR MECHANISM DEFINITELY IN HIGH AND SECOND GEAR POSITIONS AND PREVENTING RATTLES.

Shift Control Rod

1—To adjust the shift control rod, set the gearshift lever in the horizontal position.

2—Locate the clevis pin in the end of the shift control rod so that it is in the center of the elongated hole in the transmission operating lever (Fig. 10).

3—Adjust the swivel by screwing it up or down on the shift control rod until its pivot lines up with the hole in the shift control lever (Fig. 9). Install the anti-rattle spring and lock on the swivel pivot pin.

TRANSMISSION COVER ASSEMBLY

Disassembly

1—Remove the floor mat and then remove the screws from the floor plate and remove the plate.

2—Remove the clevis pin from the shift control rod and then remove the boot by untying the wires around the transmission operating lever and the end of the rubber boot.

3—Remove the clevis pin from the vacuum cylinder piston rod yoke and reactionary lever system. Remove the two shift control rod links. These links carry the bushing sleeves on which the valve links are mounted, therefore, their removal permits the valve links to drop down. Push the piston rod back in the cylinder and then install the clevis pin through the piston rod yoke and the valve links (Fig. 8).

NOTE—THIS PRECAUTION IS ESSENTIAL OTHERWISE THE VALVE LINKS MAY BE TURNED ON THE VALVE ROD, UPSETTING THE VALVE ADJUSTMENT.

4—Remove the four cap screws from the transmission cover and remove the cover.

5—Remove the idler lever fulcrum pin and the reactionary and idler lever connecting pin and disassemble the levers from the transmission operating lever.

Inspection

Wash the cover and levers thoroughly in gasoline or other cleaning solution.

1—Inspect the reactionary and idler levers for roughness or excessive wear in the pin holes.

2—Inspect the shifter interlock for free movement of the selector and

Ignition goes Modern
with **4 STAR**
The Custom Built Line

WHY should ignition lag behind? Just about everything on a car has changed radically in the past ten years — except ignition! Yet today's high speed, high compression motors put a tremendous strain on the ignition system. Certainly ignition needs modernizing!

That's why GUARANTEED is taking the lead in re-designing ignition parts — is bringing ignition performance up-to-date in the "FOUR STAR" line! Each "FOUR STAR" part is thus built for heavy duty, greater power, longer life — engineered to compensate for wear!

You can see why "FOUR STAR" is sure to expand your ignition sales. First, so many car owners are keen for "FOUR STAR" operating economy — second, they're quite willing to pay more, because they get much more! And as for truck, bus, taxi operators, watch them go for "FOUR STAR"! It's your opportunity — write us!

Engineered to Compensate for Wear

GUARANTEED PARTS CO., Inc. • Seneca Falls, N. Y.

that it does not bind on the guide plate. Also check the shifter mechanism for free movement.

Reassembly

1—Coat the reactionary and idler levers very lightly with graphite grease. Install the reactionary lever pivot pin in the transmission operating lever. (Refer to Figs. 9 and 10.) Then install the reactionary levers over the pivots. Assemble the idler levers; install the clevis pins and cotter pins.

2—Install the transmission cover on the transmission, being careful to line up the shifter interlock so that its ends fit into the slots in the shifter yokes. Install and tighten the cover cap screws.

3—Remove the clevis pin from the piston rod yoke and then pull the rubber boot forward on the yoke until the valve links extend beyond the piston rod yoke (Fig. 11).

4—Connect the valve links to the reactionary lever system by inserting the bushing sleeves on the shift control rod links through the eyes in the idler levers and valve links. Push the piston rod yoke forward over the reactionary levers; line up the link holes with a punch, (Fig. 12); and install the clevis pin and cotter pin it securely.

5—Coat the inside of the leather boot lightly with graphite grease and install it over the reactionary levers. Thread the clevis of the shift control rod over the boot and then using a punch, line up the clevis pin holes in the clevis, the washers on the boot, and the shift control links. Install the clevis pin and cotter pin. Tie the wires around the front end of the rubber boot and around the transmission operating lever.

6—Connect the selector control rod to the selector lever on the transmission cover.

7—Install the transmission floor board cover and floor mat.

Vacuum Cylinder

Whenever necessary to remove the vacuum cylinder from the car, care must be taken to place a wire through the clevis pin holes in the piston rod yoke and also through the valve links as soon as the clevis pin is removed. This is to prevent disturbing the valve adjustment.

Disassembly

1—To remove the vacuum cylinder first disconnect the piston rod and valve links from the reactionary lever system as described under the heading "Transmission Cover Assembly."

2—Remove both the vacuum and air hose lines from the fittings on the vacuum cylinder.

3—Remove the cotter pin and nut from the cylinder mounting stud and remove the unit.

Reassembly

1—Assemble a rubber cushion and steel retainer on the mounting stud; insert the stud through the lower hole in the bracket and install a steel retainer, rubber cushion, flat washer and castle nut on the mounting stud in the order named. Tighten the nut just enough to permit inserting the cotter pin and no more. It is essential that flexibility be maintained at this point.

2—Connect the valve links and piston rod yoke according to instructions given under the heading "Transmission Cover Assembly."

3—Install the vacuum and air hose lines, making sure that the vacuum hose clamp screw is toward the rear and in the vertical position. This is important to prevent interference with the speedometer cable.

K-D Flexible

Identification Lamp

The K-D Lamp Company, Cincinnati, announces a new invention

which has aroused a great deal of attention in the automotive industry. This is their Model No. 500 flexible identification lamp for V-type roofs and streamlined rounded end truck and trailer bodies. It consists of three 2½-in. beehive lens lamps mounted on a steel strip which is housed in extruded rubber. All wires are concealed. The advantage of such a lamp are manifest as they solve the problem of mounting an identification lamp on a V-type or curved surface. In fact, Model No. 500 combines the strength of steel with the flexibility of rubber and offers a positive safety factor so important to owners and drivers of commercial vehicles.

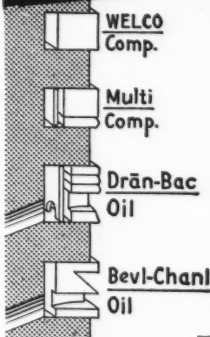


It's in the Bag

and **stays** there!

Your Profit on the job
"stays put" with—

"Drān-Bac 'H' Sets"



—it doesn't come out for "comebacks"!

You make a real profit and keep it with "H" Special Sets! Thousands of successful installations made without comeback by shopmen everywhere are proof that "H" Sets have what it takes to lick ring jobs.

More Wiping Edges; Greater Flexibility

Three features explain "H" Set superior performance: 1. All sections contact cylinder wall at all times. 2. More wiping edges plus Swedish Steel Expanders. 3. Four-way flexibility . . . in & out, up & down . . . in ring groove.

Easy on Cylinder Walls

All rings Welco finished. Genuine Aroloy segments are easy on cylinder walls and stop oil pumping and compression loss before it starts! Try "H" Sets and be convinced. Why be satisfied with less? Ask your jobber or send for name of nearest dealer and literature.



WEL-EVER

TRADE MARK REGISTERED

THE
WEL-EVER
Piston Ring Co.
TOLEDO, OHIO

Legally Speaking

(Continued from page 51)

defect or of giving the landlord prompt notice of the defect so that the landlord may repair it without delay.

A repairman renting a business building should make sure that his lease carefully and expressly covers this question of making repairs and remedying defects in or on the business premises. This involves not only the question of who shall pay for the repairs but also who shall be responsible to see that the repairs are

promptly made upon the discovery of the defect and before any customer or other business visitor has been injured as a result of the defect.

Running Out on Contract

WHERE a party to a contract fails or refuses to perform his part, what redress does the other fellow have? Sometimes it is possible to make the defaulting party to the contract deliver the goods he contracted to deliver. This is feasible usually when he still has possession or control of the goods or real estate and

the rights of innocent third parties have not intervened. This is what the law calls specific performance, that is, requiring the person to perform the contract as he agreed to do.

Very often, however, it is impossible to get specific performance. This may be because the other party no longer has the goods and can not perform even if he were willing to do so. The only redress that the aggrieved party has in such circumstances is to bring a suit for damages, seeking compensation for the loss that he has suffered by reason of the other party's failure to perform.

A suit for damages is usually the only remedy available when the default of the other party is a failure to perform a contract of service. "Specific performance of contracts of service is not ordinarily decreed," said the Supreme Court of New Hampshire recently.

For all practical purposes a repairman entering into a contract should do it with the realization that if the other party fails to perform, the only redress he is likely to have is a suit for damages—and then only for such damages as he can prove he suffered by reason of the other party's default. In most instances specific performance of contracts is difficult, if not impossible, to get.

Fraud on Creditors

WHEN a debtor disposes of his real estate and other assets so that he has nothing out of which his creditors can collect, is his action a fraud on those creditors?

It all depends. If he contracted the debts while he still had the assets, obviously the possession of the assets was an important factor inducing his creditors to extend credit. Hence his disposing of the assets thereafter would clearly be a fraud on those creditors who gave him credit while he still had the assets.

But what about creditors who extended credit to him after he had disposed of the assets? In the case of real estate a creditor has access to the public records and can very readily ascertain whether an applicant for credit owns real estate or not. In the case of transfer of stocks, securities, cash or other personal property, it is rather difficult for prospective creditors to make an independent investigation.

Maryland has a statute declaring fraudulent conveyances made by a person about to incur debts and with intent to defraud. A creditor who extended credit to a debtor who had previously made a conveyance of real estate attacked the conveyance as being fraudulent under the Maryland statute.

Deciding against the creditor, the Maryland Court said:

"It is necessary for subsequent creditors to show as a fact that the conveyance was made with the in-



You've seen the statements: "mixes with approved fluids," "mixes with standard fluids"—and the latest: "mixes with other commercial fluids!"

What Do These Statements Mean?

They mean simply that the fluids referred to mix with *certain* fluids of similar type which the advertiser arbitrarily defines as "approved." It's another way of saying they do *not* mix with *all* types.

What does the service man do when he encounters a *non-approved* fluid? How does he know whether the fluid in the system is "approved" or disapproved, "genuine" or "gyp"? He doesn't know *what*



to add—or what will mix. So he flushes the entire system and completely recharges it—when perhaps all that is needed is a few ounces replacement. And *even then* he never knows what may be added *next*!

PURITAN Mixes with Anything and Everything!

There's only one way to be sure: Use Puritan *All-Miscible* Brake Fluid—the only one engineered expressly for *refill* use—the only one that absolutely and unequivocally mixes with

anything and everything.

Puritan does not hedge on this fundamental question—and *Puritan was the first to bring it to the attention of the trade!* Save yourself trouble—USE only PURITAN—be SURE!



The Only Fluid Engineered Expressly for REFILL Use



PURITAN
HYDRAULIC BRAKE FLUID

PURITAN SOAP CO., INC., ROCHESTER, N.Y.

tention and design to defraud such creditors, and this fraudulent purpose will not be presumed, but must be proved, with the burden resting upon the one who charges the fraud."

While this case interpreted a statute of Maryland, it is probable that in most states a creditor would have difficulty in proving fraud where he had extended credit *after* the debtor had conveyed real estate or disposed of other assets. The creditor could hardly contend that he had extended credit on the strength of assets that the debtor had previously gotten rid of. Of course, the situation would be quite different if the creditor extended credit on the strength of a financial statement submitted by the debtor wherein the debtor claimed assets which he did not own.

Let Him Stay Fired

WHEN a shop employee has been dismissed, there is a definite risk in permitting him to come back and loiter in his former place of business, as a recent Pennsylvania case illustrates.

There an employer discharged an employee and paid him off. The very next day the dismissed employee's dead body was found just outside the employer's building. An action was brought by his widow against the employer on the ground that her husband had met his death while in the course of the duties of his employment. Actually, the exact cause of death was not ascertained except that it appeared to be an accident of some kind.

It was shown that on the day on which the body was found, (it was the day after the discharge) the man had been seen going back and forth through the business building in his working clothes and it was urged that this indicated that either he was continuing in his employment or, if he had been discharged on the previous day, that he had been re-hired on the following day. It was also shown that when he went back and forth through the business building on the day of his death he had certain tools of his employment with him. The Court decided that the evidence of the alleged re-hiring was not sufficient to show that the man actually was employed by his former employer on the day of his death. The Court's opinion hinted, however, that if his presence in the business building and his apparently going about the duties of his former job had been seen and acquiesced in by the employer himself, that might have been sufficient to establish that he had been re-hired; in that case the widow might have recovered substantial damages for the man's death.

Best practice for all concerned, when a man is dismissed, is to see that he keeps away from his former employer's place of business.

When Boss and Worker Sue Each Other

MANY employers have learned to their sorrow that they are legally and financially responsible for any injury inflicted or damage done to a third party by an employee in the course of his employment. A somewhat unusual feature of the law in this connection is pointed out in a recent Connecticut decision:

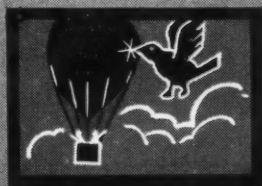
"The employer may recover from the employee the amount of loss caused to him by the employee's wrongful act, including any sum which the em-

ployer has been required to pay a third person on account of the employee's wrongful act."

Thus in a case where an employer has had to pay for damage done a third party by an employee, he can sue the employee to get his money back, assuming of course that the employee has assets out of which the money can be collected.

A rather extraordinary variation of this principle of damage liability was discussed in a recent Pennsylvania case. In a situation where an employee has injured a third person in the

(Continued on next page)



"dag" colloidal graphite
is non-injurious to rubber car parts

Use a rubber lube containing "dag" colloidal graphite on those squeaky shackles, engine mountings — any rubber part that is giving "Birdies" trouble. It is harmless to rubber and will stop the "comebacks."

Acheson worked out the formulas which have been patented with "dag" colloidal graphite as the basic part. Its minute particle size makes quick penetration sure. And the presence of the solid lubricant keeps the squeaks away longer. Any gun giving a needle stream may be used to apply these rubber lubricants — they are NON-POISONOUS, NON-INFLAMMABLE, and WILL NOT ATTACK CAR FINISHES.

Selected marketers blend and package "dag" colloidal graphite rubber lubricants under their own trade-marks. We will gladly supply the addresses of several such companies. Send for folder.

ACHESON COLLOIDS CORPORATION
PORT HURON

MICHIGAN



Legally Speaking

(Continued from page 65)

course of his employment and the employee himself has had to pay the damage to the third party, the employee may in turn sue his employer if the employee's act which caused the damage was performed as a result of the employer's instructions.

"This," says the Pennsylvania Court, "is in accordance with the rule that where an employee is responsible to pay for injuries to a third person caused, not by the negligent manner of performing the damaging act, but

as the result of the act itself as directed by the employer, the employee may recover from the employer the amount which the employee himself has had to pay for the damages."

Keeping Out Peddlers

A BUSINESS organization in a New Jersey city sent its delivery truck to a nearby city where the driver sold and delivered merchandise to customers. The city in which these sales from the truck were made had an ordinance requiring a license for the sale of any commodity or the soliciting of any business on the streets of

the city. The driver of the truck was prosecuted under this ordinance and was convicted of violating it.

The city ordinance had been enacted under the authority of a state statute governing peddlers and itinerant vendors of merchandise. The Supreme Court of New Jersey sustained the conviction for violation of the ordinance and to the argument that the driver of the truck was not a peddler, said: "One who sells in the streets to all comers and without ringing the doorbells or houses is nonetheless a peddler."

The authority given to cities and local municipalities to control peddlers and solicitors from other places varies in the different states, but, in general, a local municipality can as a rule require such vendors to meet the same license requirements as local business men.

Retail Price Maintenance Defeated

EVEN in a state with a retail price maintenance law it is not always possible to require a retailer to sell at the minimum price fixed by the manufacturer. Pennsylvania has a retail price maintenance law and an action was brought against a certain retailer there to restrain him from selling trade-marked items at less than the minimum price fixed by the manufacturer under the retail price maintenance law. Pennsylvania's law, like similar laws in other states, provides that it is unfair competition for a retailer wilfully and knowingly to advertise or sell a trade-marked item at less than the price fixed by the manufacturer.

The Pennsylvania Court refused to issue an injunction against the retailer alleged to be selling at cut prices because it was not shown that the accused retailer sold at less than the fixed price "wilfully and knowingly."

In support of its decision the Pennsylvania Court referred to a decision of the United States Supreme Court interpreting the Illinois retail price maintenance law. In that decision the United States Supreme Court said: "Section Two of the law reaches not the mere advertising, offering for sale or selling at less than the stipulated price, but the doing of any of these things wilfully and knowingly."

Keeps Keys and License Together

You need the keys to drive the car, but you might forget the license. With

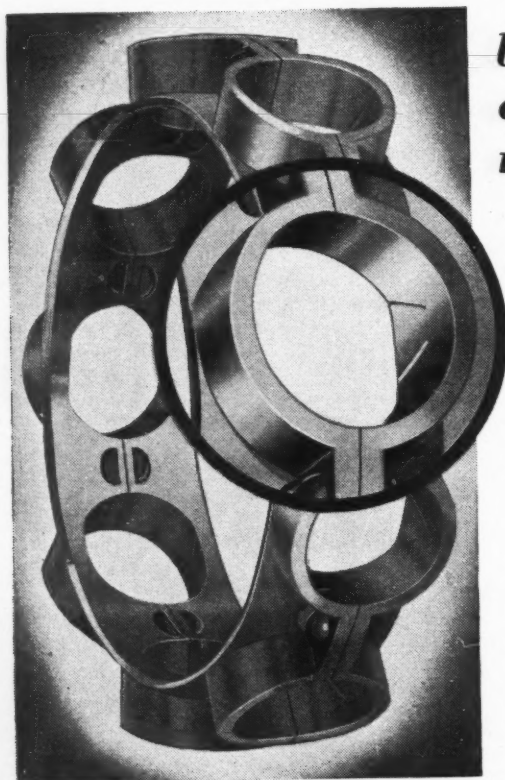
the new combination key chain and license holder you always have both. License is carried in a moisture-proof, non-inflammable

case attached to the key chain. List price \$0.15 each. The new item is a product of Sinko Tool & Mfg. Co., 351 N. Crawford Ave., Chicago, Ill.



McGILL Bronze Retainers

make ball-bearings FREE-RUNNING



*because ball pockets
are cylindrical . . .
not spherical*

LOOK CLOSELY at the contour of the ball pockets in the McGILL Bronze Retainer. You will note that they are cylindrical—not spherical. This means that the retainer does not hold the balls tightly as does a ribbon container, but instead, permits freer action. A free line contact of retainer and balls is established to reduce friction during operation. As friction spells "wear" . . . McGILL has here reduced one of the greatest causes of bearing failure to a minimum. The McGILL Bronze also dissipates heat quickly, preventing crystallization and insuring cool running.

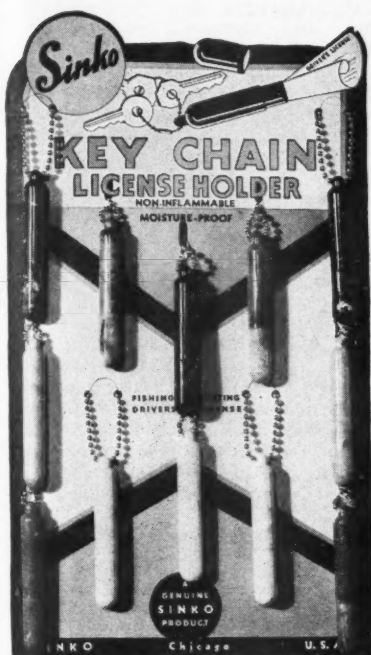
Built for HARD use . . .

McGILL Bronze Retainers are sturdier. They thrive on tough applications where loads are heavy. For satisfactory service, use them where shock loads and high speeds are involved.

*Order from
your jobber's stock*

McGILL MANUFACTURING COMPANY

1600 N. Lafayette Street
VALPARAISO, INDIANA



NEW A GENUINE *Sinko* KEY CHAIN LICENSE HOLDER



15¢
LIST

Utility Tube protects driver's, hunting and fishing licenses in non-inflammable, moisture-proof case which fits securely on car key chain. Pick up some extra change by selling this item to your regular customers.

IMPRINTING

Name and address identity as an advertising medium now available. Full particulars as to quantity, copy, etc., will warrant quotation.

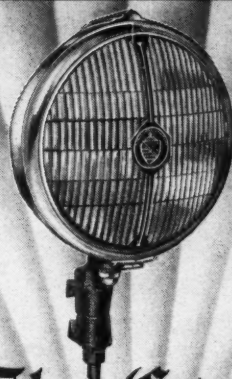
Write for catalog

SINKO TOOL & MFG. CO.

351-371 N. Crawford Ave.,

CHICAGO, U.S.A.

ANNOUNCING



The Crest

The Aristocrat of Driving Lamps

Develops 40,000 Cp—Visible 1500 feet
Daylight Brilliance—No Glare—Penetrates Fog, Snow,
Rain, or Dust—Theft Proof—Fits all Cars, Lamp, door, and
reflector all brass, chrome finish. Over-all diameter 8 1/4".
List price, with white or amber lens . . . \$9.00
Ask your jobber or write

Do-Ray Lamp Company
1458 S. Michigan Ave., Chicago, Ill.

The New **SUPER DRIVING LAMP**
by **DO-RAY**

SAFETY LIGHTING AND REFLECTING DEVICES

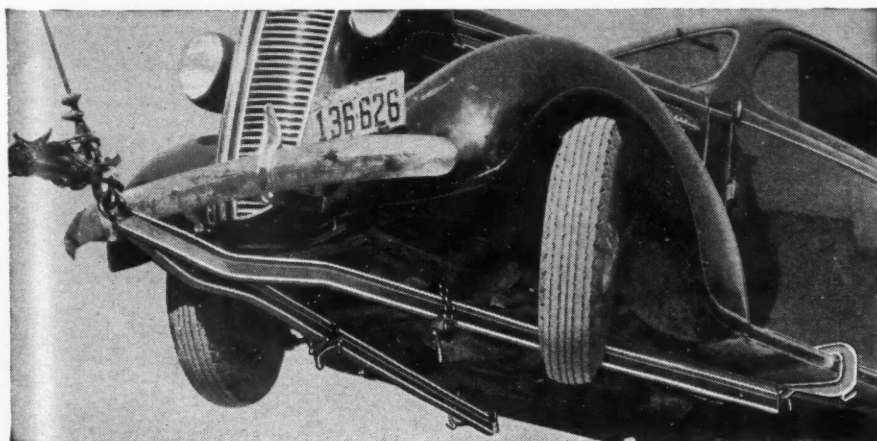
MOTOR AGE

—is a publication keyed directly to the needs of the maintenance field. Built on the requirements of the serviceman. Edited by Bill Toboldt. Read it every month.



A Chilton Publication

CHESTNUT AND 56TH STS., PHILADELPHIA, PA.



Makes Car Towing MUCH EASIER

Backward or forward. Hooks up in 1 minute! Cannot damage grilles, fenders or rear aprons. And everyone can afford the low price.

ONLY \$29.00
LIFTOW

F.O.B. PEORIA

UNCONDITIONAL GUARANTEE!

If you don't think it's the best towing device you ever had after 10 days' trial, your money will be promptly refunded. Get it now!

PARCO MFG. CO., 111 2nd AVE., PEORIA, ILL.

Clean Cement Floors 3¢^{per} 100 Square Feet!



GIVE IT A REAL TRY-OUT

Get a trial drum of Magnus Cement Cleaner. Use it on your floors. If at the end of 30 days you are not completely satisfied, send the unused portion back to us for credit on the entire drum.

Not only clean as you've never had them before, but whitened—hardened and dust proofed. There is no trouble in getting and keeping clean garage floors when you use

Magnus Cement Cleaner

It's easy to use—no scraping or scrubbing

It works fast, because it penetrates into the grease and oil and loosens it. It's safe, too—non-flammable—non-poisonous—without free alkalis.

Most important of all, it does its superior work at the lowest overall cost. A gallon will clean 100 square feet and a gallon of solution costs only 3¢.

MAGNUS CHEMICAL COMPANY

Manufacturers of Cleaning Materials, Industrial Soaps, Metallic Soaps, Sulfonated Oils, Emulsifying Agents and Metal Working Lubricants.

36 South Avenue

Garwood, N. J.



MAGNUS CLEANERS

AAA Committee to Study Finance Abuses

Appointment of a national committee to investigate alleged widespread abuses in the financing of automobiles and automobile acces-

sories was announced today by Thos. P. Henry, of Detroit, Mich., President of the American Automobile Association.

The committee, formation of which was authorized at a recent meeting of the A.A.A.'s Executive Committee, will have as its chairman, Judge A. G. Newcomb, of Cleveland, Ohio. Other members are: Truman H. Preston, of Syracuse, N. Y.; Howard D. Brown, of Detroit, Mich.; Judge Howard W. Hughes, of Washington, Pa.; and W. David Tilghman, Jr., of Baltimore, Md.

"The investigating committee," President Henry said, "will form the spearhead in the A.A.A.'s battle against the 'gyp fringe' in the car financing business. Elimination of abuses in this field, will benefit not only car purchasers but also the responsible element which forms the larger part of the auto financing industry, and cooperation of other groups will be sought in working out a program of action to end depredations by the racketeering minority.

"Among the matters to be studied by the committee are: exorbitant finance charges; finance packs, through which a portion of a fictitiously high charge is rebated to the dealer; finance kiting, by means of which a contract is shifted from one company to another until the purchaser, not knowing where to make payment, is forced into default; balloon notes in which the final payment, unknown to the purchaser, is many times higher than the regular monthly payment; repossession of cars for delinquencies on accounts covering automobile accessories; ex-

orbitant charges for repossession, towing, and storage; wage assignments in installment contracts; fictitious sales after repossession; and the many other abuses that have grown up because of the one-sidedness of laws covering installment selling of automobiles.

Sander Uses

Standard Sheet

The new Easy Electric Sander introduced by the Detroit Surfacing Machine Co., 7433 West Davison, Detroit, Mich., is a sanding, rubbing and polishing machine. Adaptable for any type of body rubbing or sanding, the new East sander uses a smooth reciprocating motion, is light in weight, and requires only one-hand operation.



One-third of the standard size sheet of abrasive fits the Easy. A new improved type of abrasive holder, holds the abrasive paper tightly on the sanding pad. From one to several pieces of paper can be attached at one time.



Clean CARBURETORS FUEL PUMPS DISTRIBUTORS with

KI-SOL No. 3

KI-SOL No. 3 is a light-bodied solvent which remains so under all conditions of use. Works perfectly in all temperatures and climates. Will not evaporate faster than water.

- Cleans in ten to twenty minutes.
- Loosens and removes carbon deposits.
- Restores metal to its factory finish.
- Will not thicken with repeated use.
- Will not lose its cleaning effectiveness.
- Has no objectionable odor.

Order through your jobber or write direct to

CARLETON PRODUCTS CO.
308 N. Sixth St., St. Louis, Mo.

Money Refunded if Not Satisfied



TOLEDO

The Fastest-Growing Replacement Parts Line

VALVES AND VALVE PARTS
PISTONS: ALUMINUM, CAST IRON
CHROME-PLATED PISTON PINS
CYLINDER SLEEVES AND ASSEMBLIES
WATER PUMPS - WATER PUMP PARTS
ENGINE BEARINGS - TIE ROD ENDS
CHASSIS BOLTS AND BUSHINGS
SHACKLES: TRYON, SILENT "U"
KNEE ACTION PARTS

THE TOLEDO STEEL PRODUCTS COMPANY
3304 Summit Street Toledo, Ohio, U. S. A.

OUTSTANDING

performance in the
Automotive Industry





YOU can MAKE \$2.00 in 15 MINUTES RESILVERING HEADLIGHT REFLECTORS The EASY and MODERN WAY—with SURE-PLATE

LET "OLE DOC SURE-RITE"—TONE up the COOLING SYSTEM in Your Car With KLEERUST—No Draining! No Flushing!



REPAIR CRACKS PERMANENTLY IN CAST - IRON & ALUMINUM HEADS, BLOCKS

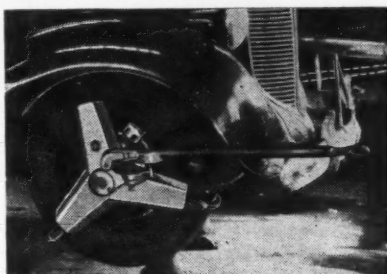


& VALVE PORTS with SURE-WELD—Accept No Substitutes!

SURE-RITE PRODUCTS CORP.
2731-3-5-7 North Sixth Street, Philadelphia, Pa.

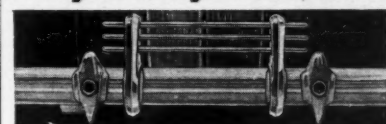
Reynolds Brake Tester

Here is the Reynolds Brake Tester, a hydraulic gage developed to give a complete analysis of the condition of the brakes. It consists of two or four webs which attach to the tires and are adjustable to the various sizes of passenger car and truck tires. A hydraulic torque wrench fits into the web and is used to turn the wheels with the brakes applied. Measures



difference in braking effort, out-of-round drums, worn lining and loose wheel bearings. The price of the complete two wheel unit is \$37.50. Hubs are available for attaching directly to the drums with the wheels removed, and can be used in place of the webs. The gage is a product of the W. T. Reynolds Co., 600 South Michigan Ave., Chicago, Ill.

They'll Buy FULTON!



GRILLE, LAMP AND FENDER GUARDS
Choice of several types . . . 2- and 3-bar, arch and vertical . . . strongly made, beautifully finished. No. 180 3-Bar Grille Guard, illustrated, lists at.....\$6.50



No. BL-1
SAFETY LATCH

Counter merchandise that sells itself! Provides priceless protection against accidental opening of rear doors. Mounts on edge of each front door. Supplied 6 pairs on attractive counter card. Price per pair.....85¢

THE FULTON COMPANY
1912 S. 82nd St. • Milwaukee, Wis.

New Post for L. S. Gillette

Leslie S. Gillette, advertising and sales promotion manager of the U.S. Industrial Alcohol Co. since 1930, has left that position to become executive vice-president of the Hazard Advertising Corp. to handle that company's widening activities in the industrial advertising field. During his nine years with U.S.I. Mr. Gillette was credited with being responsible for many innovations



L. S. Gillette

in the field of advertising. Among these was the promotion of Super Pyro Anti-freeze and Solox, the proprietary solvent.

Mr. Gillette is a former Chilton Co. specifications editor and was for four years Detroit editor of the Chilton group of automotive trade magazines.

One of Gillette's most treasured honors is the distinction of being the tallest pursuit pilot to see active service in France with England's Royal Air Force. Wounds sustained in active service put him in the hospital for over two years.

Niehoff in New Home

C. E. Niehoff & Co., manufacturers of ignition parts, hydraulic brake parts and precision testing instruments, has moved to its new home at 4925 Lawrence Ave., Chicago, Ill.

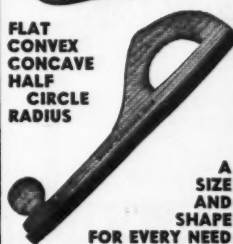
The new, modern building built by the company, provides twice the floor space formerly occupied, and is equipped with many advancements and facilities that will enable the company to more efficiently service the wholesale trade.

"DURO-CHROME" FILES • BODY AND FENDER TOOLS

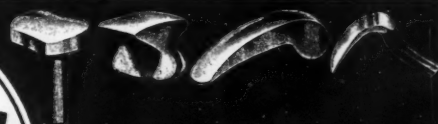
Use the
TOOLS
Designed
and Tested
BY EXPERTS
For Better-
quicker—
REPAIR WORK



FLAT
CONVEX
CONCAVE
HALF
CIRCLE
RADIUS



A
SIZE
AND
SHAPE
FOR EVERY NEED



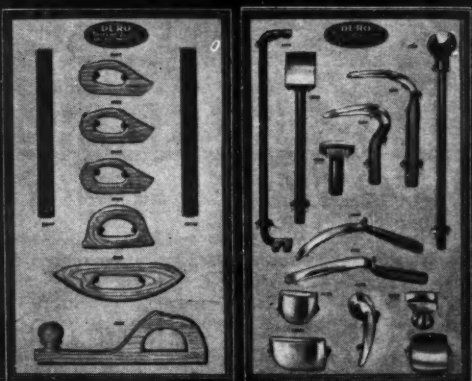
AUTOMOBILE BODY REPAIRING
is a Big Business - BECOME
AN EXPERT WITH DURO TOOLS!

Millions of cars and trucks on the road sooner or later need body repairing—it's a tremendous business. You can make more progress and more money when you use Duro specially designed body and fender tools. Each forging specially heat treated for long wear. Finished with full polished faces—delight the most exacting mechanic. Dollies and spoons for every surface. Our patented files with 8 milled curved teeth to the inch have been found by actual tests superior to files of other types. This type file is the kind used by auto manufacturers where workmanship and file costs are important. The best auto body mechanics highly recommend Duro Files and Holders. See them at your jobbers or send for catalog.

DURO METAL PRODUCTS CO.
Dept. MA 4 2649 North Kildare Avenue
CHICAGO, ILLINOIS

Complete file outfit mounted on gold and black boards 15" x 31"

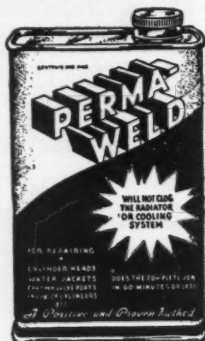
Beautiful Gold and Black Shadow boards for holding tools available.



WHEN IT'S MADE BY DURO IT'S RIGHT

HOW'S YOUR STOCK IN THE LINE OF LEAST RESISTANCE?

PERMA-WELD does a master repair job on aluminum and cast iron in 30 minutes. Welds as it flows—won't clog radiator or cooling system. For boilers and industrial use as well as automotive cylinder heads, valve parts, blocks, etc. Perma-Weld repairs permanently and dependably. Guaranteed.



PERMA-WELD



RUST-EX

RUST-EX removes radiator rust while riding. No draining nor flushing required with this "spring tonic" for cooling systems. Stops rust before it starts—dissolves all clogging dirt without harmful acids or alkalis. No labor necessary.

WATTS-WAGNER CO., INC.
119-23 West 64th St., New York, N. Y.
Consolidated Exports
1775 Broadway, New York, N. Y.

TIMKEN TAPERED ROLLER BEARINGS

THE TIMKEN ROLLER BEARING
COMPANY, CANTON, OHIO

BUY AT THE SIGN OF THE LION

Your **GUARANTEE** of Dependable Quality

Look for the orange and black **LION** Trade-mark—it is your Guarantee of Dependable Quality Automotive Parts, Supplies and Accessories. Nationally advertised, Nationally Distributed, **LION** Dependable Quality Products give complete satisfaction to Jobbers, Dealers, and Users.

Every Automotive Need From One Reliable Source

LION AUTO PARTS & MFG. CO. INC.
1920 S. MICHIGAN AVE. CHICAGO 2214-16 MAIN ST. DALLAS



HELPER

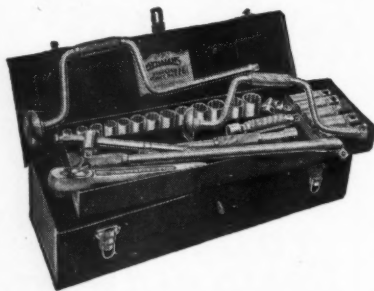
Mae Butsch, 15 years old, has helped her father at his garage since she was 12. Her father has been at the business just a little bit longer—in fact, for 23 years in Ohlman, Ill. We're proud of the fact that He's been a *Motor Age* subscriber most of that time.

New Wrench Sets

by Williams

If you are engaged in automobile or aviation mechanical work you'll find the new wrench sets introduced by J. H. Williams & Co., 225 Lafayette St., New York City, to be of invaluable assistance.

Set No. 7 is a 33-piece socket set, and is adaptable for either automobile or aviation work. Set No. 26 consists



of 26 pieces including reversible "Superratchet" and universal joint. Set No. 36 contains 34 pieces and is an "extra capacity" set, and includes 5 extra deep sockets with 12-point openings for popular spark plugs.

All sets are supplied in strong steel cases. Write the manufacturer for detailed information and prices.

SOLID STEEL HEAVY DUTY



One piece 20 gauge steel with rolled edges; braced with wrought iron members; massive, wide-tread, ball-bearing casters riveted to stay. Price \$4.50.

National Machine & Tool Co.
Jackson, Mich.

SIMPLEX PISTON RINGS



*A better ring
for less
money* **46¢** LIST

ASK YOUR DEALER WHY?

SIMPLEX PRODUCTS CORP.
3820 Kelley Ave. Cleveland, Ohio

YOU'LL NEVER KNOW

● THE PROFIT OPPORTUNITY
in Fitzgerald Gaskets until you
handle them.

THE FITZGERALD MFG. CO., TORRINGTON, CONN.

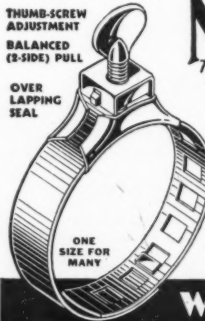
FITZGERALD GASKETS

FREE

wall chart giving complete
Motor Tune-up data for all
Carter equipped cars.

CARTER
CARBURETOR CORPORATION
2820-56 N. Spring Ave., St. Louis

THUMB-SCREW
ADJUSTMENT
BALANCED
(3-SIDE) PULL
OVER
LAPPING
SEAL



TRADE MARK
Noc-OUT
THE HOSE CLAMP WITH
THE THUMB SCREW

Seals absolutely against
leakage of anti-freeze,
radiator connections, or
heater hose. Type A.
Adjustable, the clamp
with the thumb screw.
1 size fits many. Type
GHH for heater hose.
Type GBB for booster
brakes.

WITTEK MFG. CO.
4305 W. 24th Pl., Chicago, U.S.A.

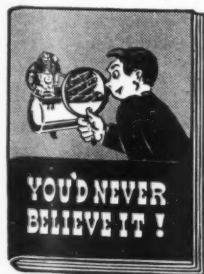
**OUTSTANDING
QUALITY**



High tensile strength, quick-acting flux and uniform high quality combine to make possible the faster, cleaner work which has given Gardiner Flux-Filled Solders their high standing in the automotive industry. Modern production methods, exclusive with Gardiner, permit prices lower than you pay for even ordinary solder. Line includes Solid Wire, Bar and Body Solders . . . also Permanent Lining Babbitt Metal.



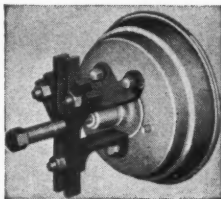
4839 S. Campbell Ave., Chicago, Ill.



**WRITE FOR
BOOKLET
ABOUT
WAYNE AIR
COMPRESSOR
ECONOMY**
THE WAYNE PUMP
COMPANY
Fort Wayne, Ind.

The WHEEL PULLER that NEVER FAILS

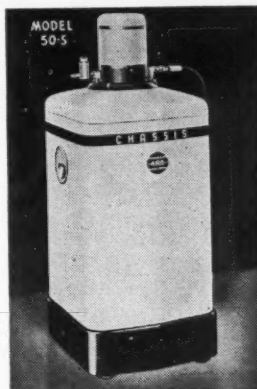
Don't lose valuable time through the failure of an inferior puller. The Springfield 500 pulls hard-to-get-off gears, wheels, hubs, etc., quickly and easily. Simple and powerful, it fits all 1929-39 cars, no extras to buy. Write your jobber or direct.



only \$7.50 delivered
SPRINGFIELD WHEEL PULLER
SPRINGFIELD WHEEL PULLER COMPANY, SPRINGFIELD, OHIO

Aro Introduces Line of Lubricating Equipment

A new line of portable and stationary cabinet type lubricators for use with 100-lb. drums has recently been announced by The Aro Equipment Corp., Bryan, Ohio. New models include the popular square type cabinets with hard baked enamel finish. Pumping unit on the chassis lubricator



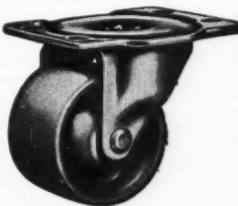
is of double acting type delivering lubricant on both upward and downward strokes of the piston. Gear lubricators are available in both pneumatic and manually operated types. Waste oil drain, spring packer, and filler for power and hand guns complete the new Standard line.

Driving Lamp Develops 40,000 Candlepower

The Bright Ray Crest, a deluxe driving lamp, is announced by Do-Ray



Lamp Co., 1458 South Michigan Ave., Chicago, Ill. The new Model 800 develops 40,000 candlepower and is visible 1500 feet. Said to penetrate fog, snow, rain and dust. Universal mounting bracket fits all cars. Available with white or amber lens. List price, \$9.00.



SET OF FOUR
Net Price
\$1.25

Sold by All Leading Jobbers

HULBERT CREEPER CO., ASHTABULA, OHIO

HULBERT'S
No.
888

Creeper Casters
Stand Up!

Made for HULBERT'S Smash-Proof Creepers, but will fit most brands. 1 1/4" iron wheels—1 1/16" wide—over-all height 2 3/4". Equipped with thread guards and wheel spanner bushings. Permanently oiled axles.

SHOPS with the "KING" UNIT TESTER will draw NEW Customers



The
"KING"
K-400
\$198.00
Complete
as shown

SOLD
ON
DEFERRED
PAYMENTS

The "KING" K-400 is impressive looking and creates a favorable impression in any shop, large or small. The use of the "KING System" of Motor Tune-up does several things for you that will increase your business. It enables you to locate trouble easily and quickly—this reduces your costs. It will enable you to prove to certain customers who know a lot about cars that you are right. Best of all, it will draw new customers to your shop and help hold old ones. The "KING" K-400 has the following individual units which may be purchased separately: (1) Motor and Ignition Tester; (2) Generator Voltage Regulator Tester; (3) All electric Spark Plug Tester; (4) New oscillator type Condenser Tester; (5) Exhaust Gas Analyzer with vacuum and fuel pump test.

R.P.M. Indicator \$37.50



The "KING" Electro-Tach (or R. P. M. Indicator) is a valuable piece of equipment because it simplifies timing of the ignition, carburetor adjusting—also for testing engine balance, and for many other uses. After proper tune-up it indicates increased R. P. M.—it requires no balancing or disconnecting of wires.

EXHAUST GAS ANALYZER \$34.00

An outstanding feature of the "KING" Exhaust Gas Analyzer is that it is accurate and quick acting. It is simple to operate and can be used for shop or road tests. Meter indicates both air fuel ratios and percentage of combustion. We can supply a combination R. P. M. Indicator and Exhaust Gas Analyzer for \$80.00.



Ask your Jobber or Write us Jobber's Name

The **ELECTRIC HEAT CONTROL Co.**
9123 INMAN AVE. CLEVELAND, OHIO
"KING" Good Products Since 1914 "KING"

✓ TOE-IN
✓ CAMBER
✓ CASTER

Checked quickly and accurately with

DUBY

SCIENTIFIC WHEEL ALIGNING EQUIPMENT

for TOE-IN the IDEAL WHEEL ALIGNING GAGE No. 361	for CAMBER and CASTER the DUBY CAMBER-CASTER GAGE No. 373
Price \$10.00	Price \$27.50

Go into the Wheel-Aligning Business for only \$37.50

Write for complete information on wheel aligning equipment for cars and trucks.

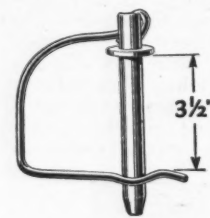
JOHN F. DUBY CO.
742 Gallivan Blvd., Dorchester, Mass.
In the wheel-aligning equipment business over 20 years.

CLASSIFIED ADVERTISEMENT

Increase your earnings. Learn body fender repairing by correspondence. Send for trial lesson now .50¢. Hope Trade School, Dept. H, Burlington, Vermont.

Coupling Pin for Trailers

A coupling pin that can be installed or removed with one hand has been announced by Lamson & Sessions Co., 1971 West 85th St., Cleveland, Ohio. It is made of high carbon steel, heat treated and cadmium plated to resist rusting. A tempered steel spring lock guard prevents removal



or accidental displacement while traveling. Available through your local jobber, or direct from the manufacturer.

Universal Appoints Hall as Chief Engineer

J. E. Hall, who has been prominently associated with the automotive battery industry for more than 20 years, has been appointed chief engineer of the Universal Battery Company of Chicago.

Mr. Hall was with the Prest-O-Lite Storage Battery Corporation for 15 years having served in the engineering department and also as chief inspector at that company's factory in Indianapolis.



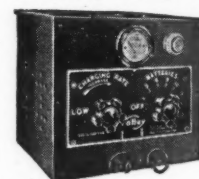
Increase your driving safety as proportionately as four wheel brakes over two wheel brakes.

Sound Range: 1 to 10 Miles
New Remote Controlled Spot Light Ready. Avoids drilling car body.

Write for Literature

BUELL MANUFACTURING COMPANY
2983 Cottage Grove Ave., Chicago, Ill.

Don't Pay More!



Don't Accept Less
Valley Battery Chargers quickly repay their low first cost in added profits to your shop. Guaranteed for two years.

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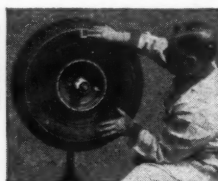
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